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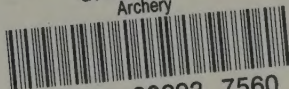
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KING GEORGE REVIEWING THE ROYAL COMPANY OF ARCHERS

# ARCHERY

ROBERT P. <sup>other</sup>ELMER, M.D.

FORMERLY CHAMPION ARCHER OF THE UNITED STATES

AUTHOR OF ARTICLE ON ARCHERY, ENCYCLOPEDIA  
BRITANNICA

SPECIAL EDITOR OF ARCHERY DEFINITIONS,  
WEBSTER'S DICTIONARY

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## FOREWORD TO THE FIRST EDITION

THIS book is an attempt to place before the public the science and art of archery as they have been revealed to me by fifteen years of study.

I believe that it is quite possible for one who is wholly ignorant of the subject, but who has average mentality and mechanical aptitude, to become an expert in archery with no other help than this volume offers him.

Any hobby that is ridden enough will lead its master into many by-paths. Some of these I have found so interesting that I have felt justified in disclosing them to others; peering backward through the vistas of history, wandering in distant lands, or groping through tortuous trails of speech.

I have treated of archery in modern civilization only with relation to inanimate targets, where all my experience lies, and have left the great subject of hunting wild animals with the bow and arrow to those who have followed that noble sport even through the Valley of the Shadow of Death.

While holding in affectionate friendship many score companions of the range, I wish, especially, to dedicate this book, which is dear to me, to

SAMUEL G. McMEEN,  
WILLIAM H. PALMER, JR., and  
SAXTON T. POPE.

ROBERT P. ELMER,  
*Wayne, Pa.*

## FOREWORD TO THE SECOND EDITION

SOON after the first publication of this book I found that it had two classes of readers, those who perused the early or historical portion with scholarly interest and blamed me for quashing the narrative with a later burden of technicality, and those who consumed the practical part with avidity and berated me for loading the volume with all that useless stuff in front. In this edition I have yielded to neither, as to do so would no longer give the picture of archery that one man sees. My best hope is that the fraternity of archers will indulgently agree with that fundamentalist who wrote that the whole book would be true if it did not contain the tale of the Persian archer who shot five hundred miles, which, he asserted, was "bunk."

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A complete bibliography of archery is beyond my power to compile. The following books and periodicals should be read by all archers who can get access to them, though the older ones are now very rare.

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composed for the Royal Kentish Bowmen in the previous century. Some are set to music.

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*Archery, its Theory and Practice.* 1856. Horace A. Ford. Second edition of 1859 is practically the same. A revolutionary and inspiring book of modest size. An enlarged edition by William Butt, of the Royal Toxophilites, was published in 1887. I used to have a copy, now lent and lost. It was not much of an improvement on the original.

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# ARCHERY

## I

### HISTORY OF THE BOW

THE bow and fire have been probably the greatest factors in helping man to rise above the brutes and to treat of the history of either, in one chapter, is impossible.

It has been said that the bow exists in every country except Australia but, even there, a tiny weapon has been discovered which is scarcely more than a foot long and shoots a little poisoned arrow which the native black men carry in their hair.

Thus, if all countries have the bow, such a general dissemination means a very ancient origin and, therefore, let us try to find where that might be, so that we can have a starting point for our story.

At once the word "ancient" sends our minds back to Greece, or Assyria, or Egypt, and there we rest in the thought that seven thousand years is enough for anybody. Yet those countries were already in a stage of highly advanced civilization, a state of culture which, in some respects, was even superior to our own. What then, of the untold ages that preceded such periods of brilliancy, when men were slowly evolving from their almost simian forms to the kind of people we know?

Did the Rhodesian man, that human ape, or the Pithecanthropus erectus, whose jaw-bone was found in a Javan river beach, or the Heidelberg man, whose fossilized skull was dug out from under sixty-one feet of earth that had formed over him, know the twang of the bowstring and the whiz of the shaft? No, they did not.

Those were the earliest beginnings of the human race and

their remains are very scanty, but after them came another set of men in Europe, for I cannot say much about Asia and Africa, who did leave a great deal of evidence about themselves because of the fact that they chipped flint stone into tools and weapons and, as the rich men of that time could not take their wealth to Heaven any more than they can now, they left them lying about where we can still pick them up.

These early people are called Paleolithic, which means "old stone" because they had not learned the art of rubbing stone into smooth shapes, a later development which gave to its period and peoples the name Neolithic, or "new stone." They chipped the stone, mostly flint, into all kinds of things for which it was adapted: scrapers for hides, borers for making holes, engraving tools for cutting wood and bones, spear heads and above all, for our purpose, arrow-heads.

Now, not all of those primitive men made arrow-heads. There were many races in the world then, as there are now, and some were more advanced than others both physically and mentally. In fact we can see by the stratification of remains in some of the old caverns that people of lower intelligence were continually being ousted from their habitations and were replaced by races of a higher type.

So, to get the most advanced opinion on the actual antiquity of the extant artifacts of archery, or rather, to learn when man first shot, I wrote to Professor Miles C. Burkitt, of Cambridge University, whose article on prehistoric Archæology immediately precedes mine on Archery in the last edition of the *Encyclopedia Britannica*. From his statement: "I myself shoot with bow and arrow. Indeed I have butts set up in my paddock," we must feel that his judgment is all the more authoritative with such practical knowledge of a bowman's needs. Quoting verbatim:

"1. Capsian man painted men with bows and arrows in the rock shelters of East Spain. While there is no direct evidence for the use of bows and arrows in Aurignacian-



Magdalenian times farther north, it's at least quite probable, and certain bone points from Cantabria may well have formed the barbs. Again, while one cannot be certain, the fine points in the upper Paleolithic (*e. g.* upper Solutrean shouldered points) may very likely have been arrow-heads.

"2. Except perhaps in very late Aurignac times there is no stone point suitable for an arrow-head but bone may have been used for the purpose.

"3. I should have said the upper Paleolithic cultures ranged from ten thousand to twenty thousand years ago.

"4. The Mousterian point is too heavy to have been used as an arrow-head. You will gather from all this that my opinion for what it is worth is as follows:

"1. That the Capsian folk used the bow and arrow and they were in part at any rate contemporary with our upper Paleolithic cultures.

"2. That our upper Paleolithic cultures, especially towards the latter end of the time, *probably* used the same weapon."

It is also but fair to assume that stone arrow-heads were a comparatively late development. Without doubt merely sharpening the stick was the first attempt at an arrow point and an artificial, detachable pile of a hard substance like bone or stone must have come very much later. Who knows but that the first maker of a stone head was not farther removed from the first archer than from us?

While formerly the only sources of information were the arrow-heads themselves, during the last three decades archæologists have brought to light—what would have seemed incredibly beyond the bounds of either hope or reason—vivid, striking, artistic pictures of the very archers, with bows and arrows in their hands. It is on the walls of deep caverns in the southwestern part of France and in Spain that these masterful drawings occur and that they have remained so fresh and perfect through the ages is one of the world's great wonders.

The best are from caves in the province of Castellon, a

mountainous district about half-way down the Mediterranean coast of Spain. Some are even so carefully drawn that we may hazard conjectures as to the kind of weapons that were used.

To understand these drawings we must speculate on the reasons for which they were made. In the first place they are either in caves, or overhanging rock shelters which by their positions on the steep sides of mountains are difficult of access, or if the cavern is easily reached, as in France, they are then carved in the very deepest recesses that a man can find, even in places that are hardly more than cracks. If they were for ornamental use they would not be hidden like that but would be in the big chambers of the caves, where they could be admired. Furthermore the drawings are always of animals that were hunted for food, even a swarm of bees being included, or in a few cases of what are presumably human enemies. Quite often the animals show arrows sticking in their sides and there is at least one lively picture of a battle between seven archers. A study of these facts leads one to believe that these pictures were religious in their nature. Caves have been associated with mystery and religious worship in all historical ages, and classic instances like the Delphian Oracle and the Witch of Endor are familiar to everyone. It is believed that when some tribe, or influential individuals wished to petition Divine assistance to their hunting or warfare, they employed the priests, who were doubtless as sincere and earnest in their faith as any who fill our pulpits to-day, to carve an effigy of their quarry as deep in the bowels of Mother Earth as they could penetrate, where it could be seen only by the eyes of their god and his human servants, and where their supplications for his aid could not be heard by the profane.

Thus construed, it is natural that the pictures should show an augmentation of those parts of the body of the supplicant which were most to be needed in the great effort about to be made.



THE STAG HUNT.—A mural painting in dark red (restored) in the "Cueva de los Caballos," near Albocacer, Castellon.—*Courtesy of the Hispanic Society of America and the Yale University Press.*

At least on no other grounds can we explain the enormous relative size of the legs of these archers, their wasp-like waists and fairly well-developed chests. The assumption seems safe that they were men who could run with enough speed and endurance to catch their game, or at least follow it successfully after they had wounded it with arrows.

If we may believe the word of several well-known naturalists and army officers, many Indians in northwestern Mexico can run like that now. Track athletics have been followed by me closely for over forty years and I fully understand what fleetness of foot means. These instances are given without comment.

"The Seris stole thousands of horses. They would break the animal's neck and with rocks, hands and teeth tear the flesh, pile great masses of it on their backs and run so swiftly that vaqueros on the best horses could not catch them. They have been known to run down horses, coyotes, deer and other game. Magee saw a number of Seri boys catch a flying bird by the tail after the bird was given a start. Señor Encinas saw a Seri run a deer down. With marvellous speed he continually headed the deer off until finally he seized it and carried it to the corral. A horse was whipped in a corral and then suddenly released. A Seri runner dashed after it, leaped to its withers and, with one hand on the jaw and the other in its mane bore it down and broke its neck. A Seri squaw ran forty-five miles between dusk and sunrise, carrying a child to a doctor and on the way ran down a jack-rabbit to pay him with." And so on.

Absolutely trustworthy confirmation of this possibility was afforded by Dr. Pope in *The Adventurous Bowman*, when he says of some African negroes:

"My archer friends tried long-distance shooting and tried creeping up dougas to get closer to game, and tried running after game, either to intercept its mad rush to escape or to run it down and shoot at close quarters.

“This latter method interested me particularly. It was a surprising thing to see two natives take after a Thompson’s gazelle, one of the fleetest animals alive, and run it down. They circled and cut off and jogged along where the gazelle wore himself out with wild racing. In less than one hour they had the gazelle by the hind leg, when she sought cover in the long grass.”

Allowing for the distortion of the human body, which in some cases is not so great as to be confusing, and allowing the same stature for later Paleolithic men as we possess at present, which their skeletal remains corroborate, their bows seem to have been of just about the same length as the English longbow which we all use, that is, about six feet or a little less according to the height of the archer.

These bows indicate that considerable progress had been made in the bowyers’ art. They are not merely broomsticks, which would bend in the centre, nor are they stronger at one end than at the other, as a natural branch will bend. Undoubtedly they are stiff in the hand and whip-ended, as are the native African bows of to-day.

The arrows appear rather long, I should judge at least thirty inches, and their feathers are clearly indicated, although their points are not. Perhaps they were still used in the primitive form of sharpened sticks. It is true that some pictures of bisons in the French caves show barbed points sticking in their sides, which the archæologists have called arrows, but they may have been spears or heavy darts, or arrows of both kinds may have been used (which is most probable), or it may even be that styles were different in France and Spain.

These gentlemen of the hunt also shot in a form that would have stood the test of scrutiny on any modern range, with the bow-arm straight, the shoulder toward the mark, the elbow of the drawing arm high and free from the body and the forearm straight with the shaft.

Almost all of these mural pictures were made by first en-

gravating a rather shallow outline of the figure in the rock and then either filling in the area with color or not, but at Laussel, in southern France, is a relief of a man cut so deep and round that it can be classed as true sculpture. Like the Venus of Milo, which classical scholars tell us is really a Minerva, who formerly held a shield against her knee, this man has both arms broken off, yet the stumps are there and their attitude is so unmistakably that of the act of shooting a bow that all who are competent to judge have agreed that this, the oldest statue of a human figure in the world, is that of an archer.

Whether these men of the old stone age are represented by descendants in modern Europe is a problem on which authorities do not wholly agree. Some think that the Irishmen from the western coast, of the type caricatured on the stage and in the comic prints, represent the last vestige of such a prehistoric race, and there are still faces to be seen in southern France with skull shapes similar to those found as fossils, but, even if so, it cannot be proved that those races perpetuated the bow and arrow. As a whole they seem to have disappeared, possibly wiped out, as savage races are to-day, by new and strange diseases to which their conquerors had become immune. At any rate it is certain that not many millennia before Christ Europe was overrun with new races from farther east, probably from the vast plains of what is now Russia, who were men such as we are ourselves. That they too used the bow is abundantly proven, because vast quantities of flint arrow-heads have been found where they lived and practically on the surface of the ground.

It takes about a century for the earth to form above an object to the depth of an inch, unless there be some unusual reason for a greater deposit, and in this way the comparatively recent date of these weapons may be determined with general accuracy. However, by this time civilizations were beginning to appear and definite history to be made.

We may safely say that the first bows were of wood and





THE ASSYRIAN BOW





of simple construction, a form that with Europeans and most tribes of savages has persisted till to-day.

A unique form of wooden bow, the like of which has never been found elsewhere, is shown in the sculptures that have been exhumed from the mounds of ancient Assyria. It is very short, apparently being not much more than four feet in length, so that it may conveniently be shot from a chariot, and yet it can take an arrow fully a yard long without breaking. This extraordinary feat of mechanical engineering is accomplished by putting a bend in the handle, so that the two limbs stand at an angle of about a hundred and thirty-five degrees from each other when they are at rest. When the bow is fully drawn it almost assumes the curvature of a semicircle, though the sharper curve of the handle is never quite obliterated. It has been a baffling puzzle to both archers and archæologists, neither of whom could understand how so short a bow could bend so far without breaking, but the simple expedient of making an experimental model proved that the curve of the wood was not so great as it looked. Mr. Thaddeus Merriman of New York, whose position as chief engineer of the water system of that city is proof of his technical knowledge, first figured out the problem in 1928 and put it to test by inserting two short wooden limbs in a bent metal handle and thus producing a bow of Assyrian form. He exhibited it at the tournament of the National Archery Association and though it was of moderate strength it shot well over two hundred yards, convincing all the experts who were present of its practicability. In the following year, Clyde A. Hutchinson, a teacher of manual training at Casper, Wyoming, believing that the original bow was of one piece bent in the middle, made a duplicate of it as nearly as he could, with a little tapering of the arms, and succeeded in shooting three hundred and forty yards. He used black walnut with back and belly of hickory. The making of a true self bow of this pattern, though rather a simple problem,

has not yet been accomplished. Strange as it seems, not a single Orientalist with whom I have communicated, and they are many, has ever been able to explain the character and principles of this bow, which figures so prominently in their sources of knowledge.

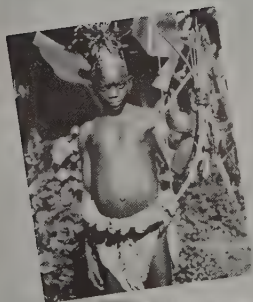
Immediately following the Assyrian bow, another and better kind of no greater length came into use in Asia which is called *composite*, because it is made of wood, horn and sinew. It will be described in a separate chapter.

African bows are perhaps the most primitive, and one type predominates over the entire continent, although other forms appear frequently. I have had several of them and, as I said before, they suggest to me the bow of the cave man. They are about five feet long, though with considerable variation, are perfectly round, with no attempt at a flat back, and are almost cylindrical for most of their length with a sharp taper, or whip end, for the last foot or so. They have no nocks, at least in most specimens, and the string, or leather thong, is fastened by simply wrapping it around the ends and tying it.

Alfred M. Collins, the noted African hunter of Bryn Mawr, brought back some bows from East Africa which were made of bamboo wrapped with cane, which had crude nocks and which had flat cane for a cord, the arrow having no nock. Some bows of the Pygmies which he had were tiny weapons less than three feet long, covered with monkeys' tails and shooting frail little arrows weighing about eighty grains.

South America presents two main styles, or divisions, of bowery. A friend brought me a couple of bows from the wilds of Paraguay which are round, made of hard wood and measure only about fifty inches. Their arrows have twenty-seven inch shafts of reed, two tiny feathers, and either spike-like wooden heads, barbed on one side, or enormous lanceolate heads of flat iron an inch wide and seven long. They would be good weapons at close range in the jungle.

Nearly all of the other artillery of South America is enor-



### PYGMY ARCHERS

Photographed by Alfred M. Collins of Bryn Mawr, Pa.



mous. My acquaintance with it seems destined to be intimate. In November, 1930, the world-famous hunter Alexander Siemel, who has killed about a score of jaguars single handed with a spear, and who, by the way, is the only man now surviving who has killed a *tigro* in that manner, spent a week at my home learning to use the bow also. In a subsequent trip to Matto Grasso, Brazil, he was fitted out with a true old English longbow of eighty-six pound weight, a seventy-six inch osage by Duff, and a great number of thirty-seven inch shafts. He also took along three single piece yew staves from Styles which he fashioned into bows down there. At first he practiced on birds, monkeys and a cougar. Finally, with one of his own yew bows, he shot a magnificent jaguar, the great beast dying within five seconds. Later, he killed at least another jaguar, perhaps more, which did not die immediately from the arrow wound but which he finished by catching it on his spear, just above the upper edge of the breast bone, as it leapt upon him.

From the same expedition a vast number of bows and arrows have been brought to the museum of the University of Pennsylvania by the ethnologist Vincent M. Petrullo, who has invited me to collaborate with him in working up the material. Some of the bows are about six feet long, most are nearer to seven feet and at least one is nearly nine feet. They vary from moderate weight to a stiffness which I can scarcely budge but Petrullo says the natives use them all quite handily. A man will jump up in a dugout canoe while in motion and shoot swimming fish with seventy percent of hits. Many of a ceremonial nature are covered with the brilliant plumage of tropical birds. The arrows, from five to six feet in length, are formed of a long reed, without a joint in it, and a foreshaft of hard wood. The points are of either bone or wood, one of the latter having one hundred and forty barbs. A great many arrows used for playing games are pierced through the shell of a tucum nut, about the size of a

golf ball, with a single slit cut transversely near the front to make it whistle. All the arrows have two long, brilliantly colored feathers.

The only primitive arrows I ever saw that were cut from the solid wall of cane were some thirty inch shafts with obsidian points from Terra del Fuego.

The Field Museum of Chicago has a marvellous collection of Polynesian arrows. Most of them are beautifully decorated reeds with no feathers and with round, slender, bodkin points perhaps eight or ten inches in length.

The natives of the northern New Hebrides make a long S-shaped bow from the aerial roots of the mangrove, the string extending from one tip to the front of the lower bend, where it is loosely bound on, and is then carried flat on the wood to the other end. Their arrow for shooting wild pigs has a removable steel head fastened to the shaft with a long leather thong, like a harpoon, and for the same purpose of acting as a drag.

The Andaman islanders have bows three inches wide and an inch thick, but with a narrow handle, that are about seven feet long. The upper limb is curved and the lower straight and in shooting it they are said to rest the lower end on the ground, as some of the Indians of Bolivia are also said to do.

All stringed instruments of music are said to be derived from the archer's bow and so it is interesting to mention some authentic cases where the ordinary hunting bow has been used directly for the production of modulated sound. The first is of Ishi, which Pope in his publication on Yahi Archery, gives as follows:

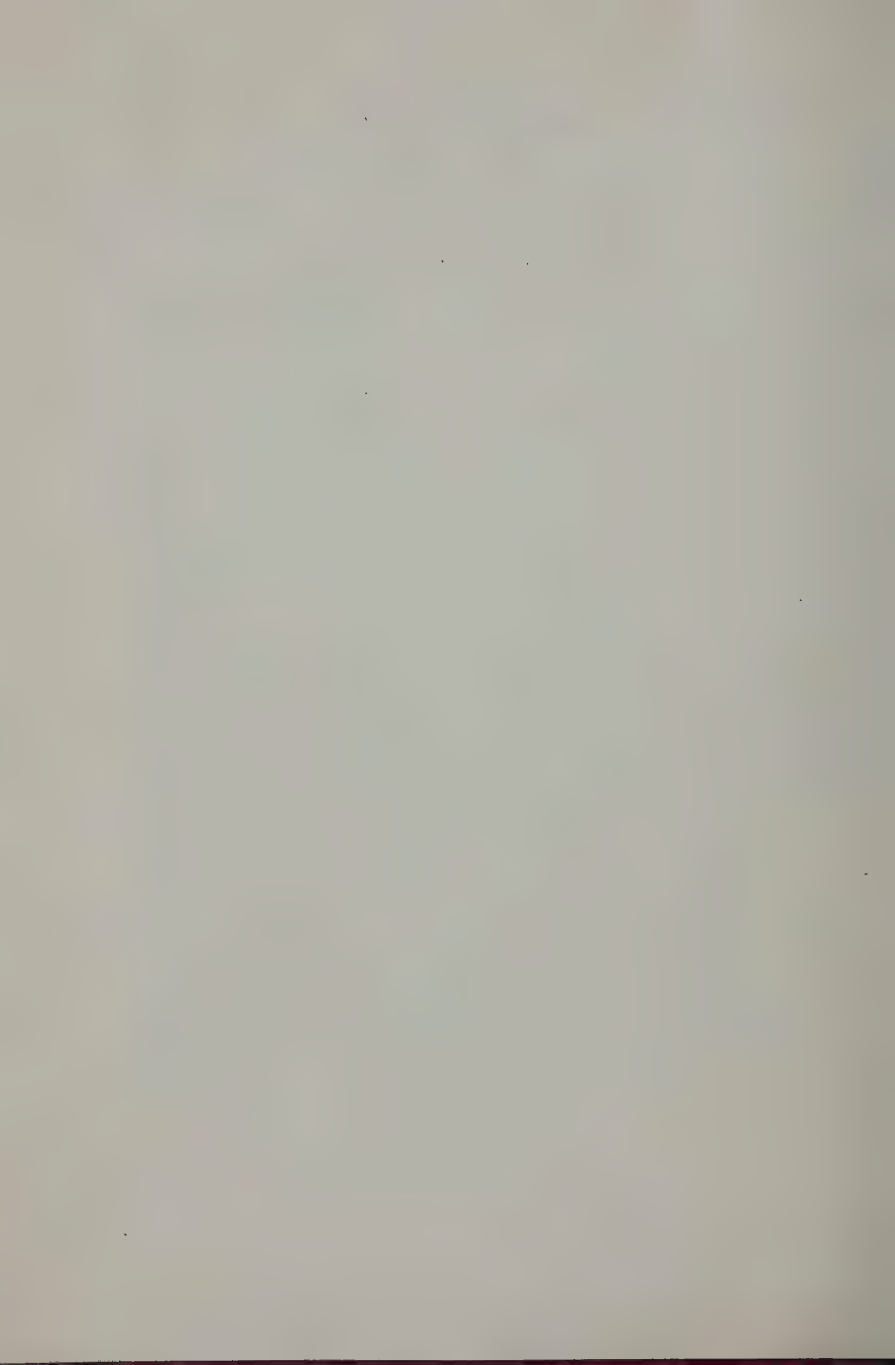
"By placing the upper end of his braced bow at the corner of his open mouth and gently tapping the string midway between the end and centre he caused clear musical notes to be produced. This sounded like our jew's-harp, and by altering the shape of the buccal cavity he was able to create a series of tones sufficient to form a melody."





ALEXANDER SIEMEL





Others are connected with an African bow, about four and a half feet long, in the Field Museum, which has a large, very thin, open, cup-shaped gourd fastened to its middle by an interposed ring of cloth. The explanatory card says:

"The musical bow, the simplest form of stringed instrument known to exist, is spread over a wide area. It is used by the Kafirs of South Africa, along the East and West Coasts and is also found in Central Africa. The theory that its origin lies in the hunting bow is not without foundation as among the Dawaras in the Southwest the native archers still convert their bows into stringed instruments. The method of playing is by plucking, striking or a bow. In any case the sounds are indistinct without a resonator which is made by placing the bow over the mouth, a hole in the ground or attaching a gourd."

Pope, in *The Adventurous Bowmen*, gives a picture of a Wassukuma negro playing exactly such a bow by holding the gourd against the pit of the stomach, thus utilizing the aerophorous viscera as auxiliary resonators. The cord is drawn in toward the bow by two strings, one near the gourd and one about half a foot from the tip.

The bows of the North American Indians are of many shapes and sizes, though they never bear the slightest resemblance to those of South America. In a monograph called *A Study of Bows and Arrows*, Dr. Pope has studied a great many with scientific care.

Most of them are short and flat and vary in weight from 28 to 80 pounds with ranges from 120 to 210 yards. There are striking individual differences. I have one little beauty that is very broad and thin, made of yew, somewhat reflexed and even backed with sinew. This is a far-western style. In the museum of the University of Pennsylvania is a great whale of a bow, nearly six feet long and made of hickory, with each limb strongly reflexed by heating and bending. It is about two inches broad for most of its length and an inch thick. I

suspect that it was held by the feet and drawn with both hands.

An adequate discussion of the bows of the North American Indians is so much beyond the scope of this book that I will carry it no further. The subject has been thoroughly worked out by the ethnologists of our government and the results published in many reports. It only needed Dr. Pope to add the experiments of a practical archer.

The aboriginal bow of Japan, which is shown in ancient works of art, seems to have been a plain wooden bow about five feet long, with tapered ends and held in the middle.

The bows of to-day, which have been the national style for many centuries, are entirely different things, unlike any other bows on earth. In general they are seven feet five inches long, and are all about an inch wide, although they come in three thicknesses, one-half, three-quarters or one inch according to the weight desired. Externally they are ornamented with lacquer, often beautifully decorated, and are bound with cane.

When these great bows are strung they look exactly like the little toy bows sold in Japanese shops, but when they are relaxed they assume a strongly reflexed shape, which is made possible because they are constructed of three lamellæ. Sometimes all the layers are of bamboo and sometimes the inside one is of mulberry. The most striking peculiarity is the marked difference in the length of the limbs, the lower being only 33 inches and the upper 57.

It has been said that the idea of making one limb so short is derived from the child's bow, or first bow of all, which is made of an untrimmed stick, thicker at one end. Such a bow has to be held near the thick end to give a smooth effect. I do not agree with this. In the first place, as we have seen, a primitive bow of the regular type was formerly used in Japan. Furthermore this weapon partakes strongly of the characteristics of the composite bow in its being made of more than one strip and greatly reflexed. Also the lower, short limb is thinner



*Photographed by Larabee*

SOUTH AMERICAN INDIANS SHOOTING FISH



than the other, which is the opposite of the bent stick. In fact it is obviously an ingenious way of getting a fair bow out of the poor material of flat bamboo. Most of those I have seen have a cast of only 150 yards. If the arrow be placed in the middle of the bow it will hardly fly at all.

Shooting these bows is done as a set matter of inherited form, like a Scotchman playing the pipes, and an error in pose or gesture is as bad as a miss. The archer stands sideways to the target with his feet spread wide apart and toes pointing outward. The arrow is placed on the right side of the bow and drawn with the thumb. The draw begins above the head and ends at the level of the mouth, with the drawing hand as far back as the shoulder. The bow is held loosely and must turn around in the hand when it is released.

Some years ago Mr. A. Rankin Clark, United States champion in 1900, shot against a professional archer and his pupils in Japan, using their bows but our method, and beat them badly. As archery is taught in the Japanese high schools the distance is about thirty yards. When Clark moved back to shoot at eighty yards the Japanese thought the range enormous.

There is a rare Japanese bow in the Peabody Museum at Salem, Mass., which is very short and was intended to be used in the house for protective purposes. It was to the longbow as the pistol is to the gun.

The bows of the various races of the earth follow more or less these general types, but even the same kind of bow is not always shot in the same manner.

The pioneer work of investigation in this interesting subject was done by the late Professor Edward S. Morse, a young archer of the vicinity of Boston in the early eighties, who published, in 1885, a paper called *Ancient and Modern Methods of Arrow Release*, which attracted the attention of leading ethnologists. In 1922 a supplementary pamphlet called *Additional Notes on Arrow Release*, brought up to date the ob-

servations which he had made during the intervening years. Professor Morse was head of the Peabody Museum, of Salem, Mass. I have met him at the museum and also at tournaments where he has been present as a spectator.

Excellent and original as is his work it seems to me that because of the great amount of additional light that has been thrown on the subject since the attention of explorers and other scientists has been attracted to it, the system of classification should now be changed in the interests of simplification and comprehensibility.

The different positions of the hands and fingers were described as *releases*. To my mind this term is not so good as the one I have chosen because the real purpose of the act is to *draw* the arrow, not to let go of it, which is the correct meaning of release, or loose. We might properly speak of a quick release, a sluggish release, an open release or a closed release, but not of a three-fingered release. It should be a three-fingered *draw*.

There are three great types of draw, two of which have many modifications:

1. The Pinch Draw.
2. The Thumb Draw.
3. The Finger Draw.

The Pinch Draw is called by Morse the Primary Release, and this, I think, is the best of his names. It is the natural method of shooting the bow which will invariably be followed by the untaught individual of any race who has the weapons placed in his hands for the first time.

By this primitive method the nock of the arrow is placed against the string and held there by pinching the end of the arrow shaft, the part of the arrow which the French call the "heel," between the first joint of the thumb and the second knuckle of the index finger. The arrow is nearly always put on the right side of the bow, but it may as well be shot from the left, and is so done by some peoples.



It is a very accurate way of shooting with a weak bow at short range, but if a strong bow be used the arrow will slip out of the grasp. To overcome this some races, including many tribes of North American Indians, cut away the wood so as to leave a bulbous end which can be held with a very strong pinch. At other times that part of the arrow is simply roughened to create greater friction. With this style of shooting it is possible to have a very shallow nock, such as any boy naturally cuts in a home-made arrow, because the arrow is held on the string by pressure on both of its sides, or it may be shot with no nock at all. Longman, in *Badminton*, says that arrows with bulbous nocks warrant a strong presumption that they are shot by primary loose, but this is by no means a trustworthy rule to follow, as nearly all Oriental arrows, which are drawn by the thumb, and most ancient European arrows, which were drawn by the fingers, had nock-ends that were very much enlarged to prevent breaking.

The inherent weakness of the pinch, which depends solely on the friction of the skin of the thumb and finger on the sides of the arrow, led many tribes and individuals to attempt to strengthen the draw by adding direct traction of the bow-string. It is a natural step to take, as is proven to my own satisfaction by the fact that it was invented absolutely independently by some of my playmates when I was a small boy. In fact, one of them shot that way at the Eastern Tournament in 1923 although he was not entered in any contest.

I think that the term Assisted Pinch Draw might properly be applied to this method as being easily remembered and descriptive of the process. Morse called it the Secondary Release when only the second and third fingers were applied to the string and Tertiary Release when the first three fingers were applied.

At best this is not the strongest possible draw for the heaviest bows, and peoples who developed archery to the highest degree came in time to realize that it was the cord and not the



arrow which was to be drawn and that the best way to do this was to hook one or more digits under it and thus pull by direct traction rather than by friction.

It so happened, for what reason I do not know, that the chief Asiatic archers made this traction with the thumb. The Thumb Draw is very powerful; by it Ingo Simon of England draws his Turkish bow of 100 pounds weight at the present day, to say nothing of the vast armies of Orientals who have used it for many centuries. Technically the arrow is placed on the right side of the bow, the thumb is usually protected by a ring of metal, jade, ivory or bone, (I have a typical one of jade which is one and one-eighth inches long, one-eighth inch thick and big enough to fit a thumb of moderate size snugly), and the tip of the thumb is tucked under the knuckle of the first finger for support. The fingers do not touch either the arrow or the cord. Even this draw permits of variations. The Japanese rest the string on the pad of the first joint or phalanx, which is protected by a thick glove. The Chinese slip a ring over the second joint and catch the cord above it against the second metacarpal, thus adding an inch to the draw. In any case it should be noticed that to draw by the thumb gives about three inches more than by the fingers.

The Finger Draw is the method which is used by all Europeans and by many aboriginal tribes the world over. In it the thumb is usually not employed. In fact the only exception I know of is the powerful Sioux draw which is used by some of our modern American archers of the Pacific slope.

The arrow is placed on the left of the bow and two, three, or four fingers are hooked on the string, with the tip of the arrow lightly held, like a cigarette, between the first two. Both the finger draw and the thumb draw can be used only with arrows having deep nocks which will not easily fall off the string.

Dr. Morse called this the Mediterranean Release, because it seemed to him that it was used principally by races living

around that great sea. In fact the chief object of his paper was to suggest that ethnic kinship might be indicated by a resemblance in the manner of using a bow. To a limited extent this is true, but careful investigation has undoubtedly shown that it cannot be carried very far. The best argument on his side is afforded by the wide-spread use of the thumb draw in Asia. It does not, however, imply any blood relationship, because it is used, for example, by such widely different racial stocks as the Persians and Chinese. It seems to me that just as one great individual in a country, for instance Ford in England, may be imitated by thousands of other archers, so a nation like the ancient Parthians, who excelled all the rest of the known world in the use of the bow and who carried their arms into many parts of Asia, might set a style which would be copied by other peoples as easily as the great Asiatic religious beliefs have travelled over that vast continent.

It is true that the pinch draw is used by some very primitive races, such as the Pygmies of Africa, but it is equally true that the Negritoes of the Philippines, who are of about the same rank in the social scale, use the three-fingered draw as we do ourselves. When it was pointed out that the Esquimaux used the three-fingered draw some scholars even hazarded an opinion that it might be taken as a link in the evidence of the residence of Norsemen in Greenland, a fact no longer disputed since the discovery of their graveyard and exhumation of its contents.

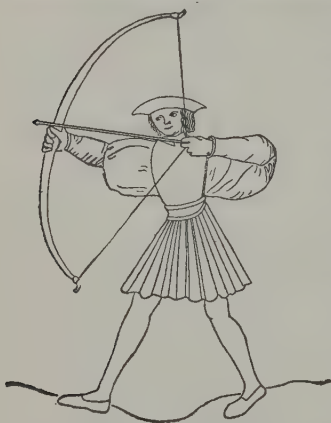
It is very easy to let the imagination play on such subjects as this. Dr. Pope discovered that the splendid Wassukuma archers below Nairobi use the two-fingered draw, and can shoot 247 yards with it. So did some of the archers of ancient Egypt. I have seen it suggested elsewhere that the features of negroes in that general portion of Africa were like those of the ancient Egyptians, and so one might go on to deduce evidence of consanguinity or similarity of previous environment which might be more fascinating than true.

One thing which may be affirmed with certainty is that the finger draw is as universal in Europe as the thumb draw is in Asia, in fact more so, because Europe no longer contains any tribes of savages who might use variations of the pinch. Even the carvings in stone of Roman mercenaries who used composite bows, or the later paintings by mediæval artists of archers who also used them show only the finger draw.

In the oldest European pictures, even to the end of the sixteenth century in England, it is far more usual to see the two-fingered than the three-fingered draw. The four-fingered

is never shown, unless in drawings that are so poorly executed as to be discreditable. At the present time two fingers are commonly used in France and Belgium. In England practically everyone uses three but there are occasional exceptions, such as Champion C. E. Nesham, of England, who used four fingers, and Championess Armitage, who uses only two.

Let us now consider the origin of our own weapon, the English longbow.



A Hunter, from "*Horæ Beatissime Virginis*," Paris, T. Kerver, 1522.

If the ancient Britons used a bow its exact nature can only be inferred, as none is now in existence and Cæsar does not mention it as being among the arms of the Britons. Ascham quotes an ancient anonymous chronicle which said, "The Saxons subdued the Britons wyth nothyng so much as with their bowe and shafte, whiche wepon beyng straunge, and not sene here before, was wonderful terrible unto them."

The spirit of modern scientific investigation will not accept an unsubstantiated statement like that as final, and would

probably lead us to investigate the nature of the bow which was used in later times by the unchanged remnant of the British race, the Welsh and the Irish.

The only known description of the ancient Welsh bow is contained in the *Itinerary of Wales*, written by Gerald de Barry, whose name is given in Latin as Giraldus Cambrensis, or Welsh Gerald. He was born at Pembroke, in the extreme southwest corner of Wales which juts out into the sea, in 1146, and he died in 1220.

"The bows of the Welsh," he observes, "are not made of horn, or white wood, or yew, but of wych elm plants; they appear neither handsome nor polished, but, on the contrary, rude and misshapen. Yet they are stiff and strong; not so well calculated to cast far as to give a weighty blow in a close fight."

When I was searching out the philological side of archery I visited Dr. Austin O'Malley, of Philadelphia, a famous Gaelic scholar who was formerly professor of comparative philology at Notre Dame University, Indiana. Among many things which he jotted down for me was the following interesting note:

"The old and mediæval name of the Irish was *Scot*. The Scotch Highlanders are an Irish colony. *Scot* as a race name died out in Ireland but remained in Scotland. The root of the name *Scot* is *sciot*, a bowman; allied to Scythian; old English *skytte*. A Scotch man is a bowman. Compare German, *scutten*, archer."

Within historical times the Irish used the dart more than the arrow, but various references prove that they possessed bows and it is always stated that they were short and used short arrows. Edmund Spenser, the poet, speaks of them in his *View of the State of Ireland*, which he wrote in 1594, after fourteen years of government service in that country. Nearly eighty years before that time a statute of the English government had advised that the King's subjects in Ireland should

be taken bowstaves, because "in default of longbows divers of them apply themselves to Irish archery, as using Irish bows, which induceth to Irish disposition." Most of us need not be told that this could mean nothing but short and quick.

A drawing by Albrecht Duerer, reproduced in *Badminton*, shows an Irish archer carrying just such weapons, a powerful stick of a bow, not more than five feet long, and four thick, heavy arrows of perhaps two feet. Two of the shafts have armor-piercing heads, one is a broad head and the fourth head is forked.



Irish Archer, 1521.—From "Drawings  
by A. Duerer," Lippman.

Now, I think that this old Irish bow was the very kind that Giraldus referred to as being used by the Welsh. It fits his



description exactly and, in particular, that forked arrow was "not so well calculated to carry far, as to give a weighty blow in a close fight" that would rip the very gizzard out of a man.

I should like to call attention, in passing, to the fact that Giraldus spoke of bows of horn, although it is as certain as anything in the history of archery that the bows of the English were always made of wood. Where, then, had he heard of horn bows? I suspect from the returned Crusaders and, to my mind, this sentence of Giraldus is very strong evidence that enough of those captured Asiatic bows were sent home among the spoils of war to make them fairly well known in the British Isles. I do not mean that they ever came into general use, but they were there, just as our museum specimens are with us to-day.

If we agree that the original British bow was a short one, then we must acknowledge that the six-foot longbow was introduced by one of the invading races. It has usually been stated that it was first used by the Normans at the Battle of Hastings, but I think that it had been used for centuries before that time by both the Saxon and Scandinavian conquerors of England.

All the writers on archery of former years have claimed that the bow used by the Saxons was short, but I cannot agree with this view, although perhaps it was weaker than the powerful Norman and English bows of later centuries. To me the difference was more of degree than of kind.

Fortunately some valuable archæological discoveries have removed all doubt as to the exact form of the Saxon bow by supplying us with great numbers of the bows themselves, looking almost as though they might be picked up and shot. Such a perfect description of them is given in the *Archers' Register* for 1912 that I will take the liberty of transcribing it.

"In 1863 there were found in Nydam, Sleswig, three very ancient galleys, one of them preserved to the very slightest detail. It would be of the greatest interest to speak of these



boats, but this not being the proper place for doing so, I will confine myself to their contents, which consisted mostly of the weapons of the inhabitants of Sleswig and Holsatia in A. D. 400 to 450. Hengist and Horsa set out from these countries in 449 and must have had exactly the same weapons which were found in the Nydam galleys.

"Nydam is a moor near the Alsensund, opposite the town of Sonderburg, and was once a fjord of the Holsatian sea. Since 1590, however, it has been cut off from the sea by a dyke, and is now meadowland, and it is here that these boats were found. Only small pieces have been left of one, another was burnt by Prussian soldiers in the war of 1864 for cooking their coffee, and the third is the celebrated 'Nydam boat,' preserved in the Kiel museum. Among hundreds of ancient items found in these boats were about 40 bows, over 100 arrows, a wooden quiver and the bronze mountings of another.

"With respect to the bows, they are mostly in very fine preservation, some looking new. They are from 170 to 187 cm. long (about 5 ft. 7 in. to 6 ft.); their diameter is from 2.8 to 3 cm., tapering toward each end, the real yew bows being somewhat thinner than those of fir. The transverse section is either round or of the same form as to-day, but the flat side is the belly, not the back, of the bow. The material is the wood of conifer trees, most of them of pine but a few of yew, easily recognizable by its many knots and pins. The bows are mostly worked even, without lifting the knots, but some of those in the yew bows are lifted. They are all cut out of saplings, I have not seen one cut out of the stem of a tree, therefore in none is the back sap and the belly heart. It may be from this reason that not a few of the bows are broken and mended in the same way as in these days by wrapping with thread.

"All the bows follow the string a great deal, a token that they were kept strung, a point also otherwise proved. The bows have had no horns, and have no nock fit for taking up

the loop or eye of the string. There are small flat notches on the ends of the limbs, not always on the same side—sometimes they are on the belly side and sometimes on the back—but they are not deep enough to take up the eye, and the string must have been permanently tied on the bow in the same manner as can now be seen on all African, and most savage, bows. These notches would prevent the string from slipping down the bow, but there are also other contrivances for the same purpose, some of the bows having shouldered ends, some a hole and others a bronze button near the end.

“The string cannot have been of flax or hemp, but must have been of some animal substance, such as wool, gut or sinew, for in this moor vegetable matter is preserved, while animal perishes, and no bowstring has been found. This supposition is borne out by the fact that the strings, as shown by the nocks of the arrows, must have been very thick, and, in order to be serviceable, strings made of animal substances must be thicker than if they were made of vegetable matter. In my opinion the bows were not very strong, at the outside 50 pounds weight, and even this may be too high an estimate.

“The arrows were of some coniferous wood, the grain being very straight. They were 73 to 90 cm. long (29 to 37 inches), of barrelled shape, 9 mm. thick in the middle and knobbed at the end for the wide, 5 mm. nock.

“Each arrow had four feathers, whose location is clearly visible, from 10 to 13 cm. long. To fasten the feathers a groove 1 mm. was cut, the quill imbedded in it in resin and the whole fastened with a spiral winding of thread.

“Almost all the arrows bear an arrow-mark, some being fancy work and some Runic characters.

“The heads are made of bone or iron and have the same shapes in either material. They are mostly of the leaf or awl type and some are barbed. The heaviest head weighs 15 grm. and the whole arrow weighs about 45 to 50 grm. or 8 shillings. This would be a heavy arrow for a 50 pound bow and could

hardly be used beyond 150 yards. The quiver would hold about a dozen arrows."

The original book on these antiquities, written by their discoverer Conrad Engelhardt, was presented to me by my friend Carl Dreyer of Copenhagen, who, himself, is an accomplished archer at both the targets and wild game. Like most authoritative works, it places the date of the boat and its contents well back in the third century, or at least two hundred years before the reputed date of the first Saxon invasion of England. A full sized cross section of a bow is  $1\frac{7}{16}$  by  $1\frac{1}{8}$  inches. In conformation they are remarkably like the English bows from the *Mary Rose* (page 70) which were made more than a thousand years later.



Saxon Defending His House. Eighth Century Whalebone Casket in British Museum.

Those writers who believe that the Saxon bow was short base their opinion on the appearance of the bow in a few ancient carvings but I contend that where the art is so crude that the string is made as thick as the bow it is not safe to assume that the length of the weapon is proportionately correct.

Eight full centuries intervened between the sinking of the Nydam bows, and of similar ones found in other bogs, and the winning of England by William the Bastard, as long a period as from the Conquest to the American Civil War.

Whatever bow the Normans brought to England must have been the kind they had previously used in Normandy. The

Norsemen were ceded Normandy in 911. They came there from the Scandinavian peninsula, and they came by sea, directly.

It is therefore reasonable to expect that if any evidence from grave-findings or from the sagas concerning the bow can be discovered it will show that the six foot bow was the one the Vikings used and, therefore, the one that was also used by William.

If we accept the authority of Du Chaillu's *Viking Age*, the question is already settled for us, as his words are: "The bow (bogi) and the arrow (or) were among the most important weapons for war. The bows discovered are generally about six feet long."

Corroborative evidence may be obtained by considering the strength with which the bows shot and the kinds of arrows that were used. Fortunately many, or even most, of the statements made in the sagas have a peculiar directness which carries the conviction of truth. They mirror the hard verities of the daily struggle with man and nature that was the daily task of the Norsemen. Here is a pen-picture which tells of an arrow driven the whole length of a man's trunk:

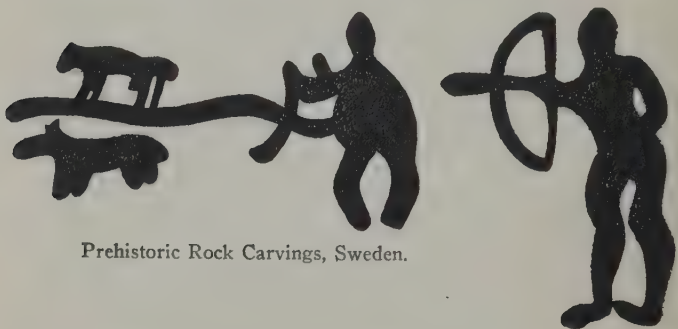
"King Harald warmed himself at the fire, and came with his back close to it. He was on his knees and stooped forward so low that the hind part of his thighs stood out. Palnatoki laid an arrow on his string and shot at the king, and the arrow hit the king straight between the thighs and came out of his mouth. The king fell dead, as was to be expected."

All who have read Dr. Pope's accounts of the penetration of an arrow delivered from a strong bow will realize at once that his experience with animals corresponds very well with this incident, making clear the fact that the bow must have been a very heavy one.

Most of the arrow-heads which are found in the tumuli are fitted with shanks, to be inserted in the stele, but some have

sockets which show the diameter of the arrow. The largest heads are as much as nine inches long and were set on shafts three-eighths of an inch thick. Every archer knows that such tremendous heads as these must have had very long shafts to give a well balanced flight.

Furthermore the Norsemen, as a race, were physically built to draw a long arrow, which would mean a longbow, for the average length of the skeletons found in ancient burial places in Scandinavia is over six feet. Taking all the facts together I feel that we are justified in carrying the English bow back to a remote Nordic origin. Whether a short bow preceded the long one, as it did in almost every country, is a question. There is an ancient rock carving in Sweden, vastly older than the sagas and even than most of the graves which clearly shows a man shooting a bow. If we were to accept the proportions as being literally exact we would have to compute the length of the bow as being about three feet. Yet in the same set of carvings is a man ploughing with a pair of beasts that look more like Scotch terriers than anything else.



Prehistoric Rock Carvings, Sweden.

When Charlemagne tried to extend his conquests into the peninsula of Denmark he stirred up a hornets' nest that was destined to change the history of the world. Up to that time the Norsemen had spent their fighting instincts in petty civil



wars, but when they turned against a foreign invader and felt their power when united they rapidly developed into the Vikings, the greatest race of fighters the world has ever known. They were seafarers, with the only navy in the world. They would sweep down on a coast, raid it before the local militia could be gathered and be off to sea. The first of their attacks on England was about the year 800, or a little earlier. The initial successes led to others and as the prizes to be won became greater their character changed from the incursions of pirates to the fleet manœuvres of kings. From reasons of patriotism, or allegiance to the English name, or to lack of proper historical ratiocination, or to what else I know not, the almost complete subjugation of England by the Norsemen has never been fully acknowledged in the school history books until recently. Few of us realize that for the century from about 850 to 950 more of England belonged to the Norsemen, and was settled and ruled over by them, than belonged to the English. They owned everything northward from the Thames and even south of the river their influence was very great. When King Alfred began to make a little headway against them he was cooped up in the southwest corner, in Devonshire and Cornwall. Now who dares to say that this vast army was without bows and arrows?

Yes, I believe that the longbow was in England for centuries before William came, but it was brought by the same generic stock of people and received its great importance after his time because he used it to advantage at the Battle of Hastings.

However, he might not have won that battle if Harold of England had not had to fight as hard a one against Harold of Norway the month before. It was called the battle of Stamford Bridge and was near York. That the bow was freely and effectively used is shown by the following quotations from a saga. Note that the English shot as well as did the Norsemen, and that the cavalry used the bow.

"The English horsemen rode around the array but, as soon as they came near, the archers of the Norsemen shot at them as fast as they were able. The English saw that they could effect nothing and rode back. The Norsemen thought they were going to flee, and followed in pursuit; but as soon as the English saw that they had broken their shield-burgh they rode at them from all sides, shooting arrows and spears at them.

"Then, as the English almost fled, Harald Sigurdarson was hit with an arrow in the throat, so that a stream of blood gushed from his mouth; this was his death wound."

Two-thirds of the army with which William conquered England were foreign adventurers, most of whom came from the neighboring parts of France and the Low Countries but some from as far away as the Norman duchy of Apulia on the Adriatic coast of Italy. It has always been said that the portion of the troops who were archers were Normans and I see no reason to doubt it.

Just how much they contributed to the victory at the Battle of Hastings has long been disputed, but at least it must be conceded that they played a very important rôle at the finish. At the beginning the English were posted at the top of a hill, with a long slope in front and a forest at their backs. Their shields were locked in front of them, making a wall, or shield-burgh, and some writers claim, on rather uncertain grounds, that they added to their defense by sticking sharp poles in the earth before them to impede the cavalry of the enemy.

When the Normans began their attack, the archers were ordered to shoot directly at the English, but their arrows were caught on the shield-wall and made no impression. The footmen were then ordered to charge but they were hurled back. The final thrust was by the heavy cavalry but they, too, failed, lopped to pieces by the long Danish axes used by the English.

After these discomfitures the Bretons on William's left flank broke and fled, thus, paradoxically, turning the advantage to his side, because the English made the same mistake as had



the Norsemen at Stamford Bridge, and broke their shield-wall to run after them. Immediately the Norman cavalry wheeled about, pursued the pursuers and cut them down. This suggested to William that he do the same thing again and, by making a false retreat, draw the English out. It was a successful ruse and, as a result, the group on the hill became much smaller.

At this point the archers so changed their tactics as to decide the fate of the day, for they aimed their shafts high in the air and let them drop inside the wall of shields, thus piercing the English defense and inflicting slaughter that could not be endured. By a whim of fate King Harold was shot in the eye as the other King Harold had been shot in the neck the month before.

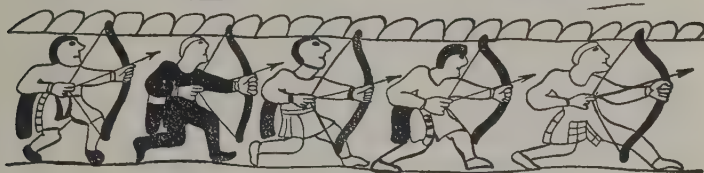
A nearly contemporary artistic conception of the battle of Hastings has come down to us in that delight and solace of the historian, the Bayeux Tapestry. Thousands of tourists view it each year as it now stands on exhibition, encased in glass, in the old bishops' palace next to the cathedral of that ancient town in Normandy. It is a band of linen twenty inches wide and 231 feet long on which are embroidered, in eight colors, seventy-two scenes pertaining to the Norman invasion. Probably it was executed at the command of Bishop Odo, the Conqueror's half brother; most likely by the needles of women whose husbands and sweethearts took part in the events it portrays. I saw a duplicate of it at the Chicago World's Fair of 1893 which was worked by the ladies of modern Bayeux.

In all, it shows twenty-eight Norman archers, one of whom is on horseback, and one English archer who, though obscurely placed, should not be overlooked by historians because of our thesis that the bow was not introduced into England at this battle. The disparity of numbers is meant to indicate the relative proportion of archers in the two armies.

The tapestry consists of a center field, containing the chief scenes and a cursive legend in Latin, between two borders

which also are worked, the upper with mystical birds, beasts and the like, and the lower, at least in parts, with incidents secondary to the main action. Archers first appear in the large field where the battle of Hastings begins. Four of them, shooting straight ahead, are grouped to one side of the charging Norman horsemen. One wears the hauberk of a knight, proving that archers were not always of low rank, while the others are dressed in dark coats and bloomers that would not look out of place on a modern archery field. The latter were probably the plain men, in greater numbers, for it must always be remembered that single figures may stand for masses of soldiery. Opposed to the advancing cavalry are the English knights, or men at arms, throwing javelins, wielding axes and carrying interlocked shields which are already stuck with arrows. They are distinguished by moustaches from the smooth shaven invaders. Behind them and shooting straight out between is the lone English archer, clad in dark cloth to show the inferior rank and small of stature to indicate the paucity of those whom he represents. He has done no perceptible damage, as no Normans are shown who are stricken by his shafts. The battle then rages through several scenes but no more archers appear in the main field until the issue has been decided.

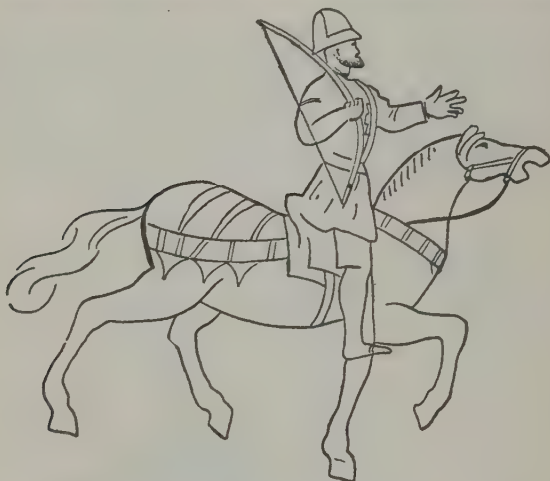
Henceforth archers are shown only in the lower border, possibly for economy of space in design but more likely because they were looked on as adjutant to the main conflict. Where the legend says, "Here Bishop Odo, holding a club, rallies the young troops," a line of seventeen bowmen begins to advance, moving with long strides and shooting at a moderate elevation that would mean direct attack. In the next scene called, "Those fell who were with Harold," seven archers are standing still and shooting at a much higher angle, some with large quivers upright on the ground beside them. The next one, "Harold is slain," shows that moustached monarch drawing the fatal shaft from his right eye, while a few



Archers from the Bayeux Tapestry.

knights left around him fight back to back and fall in death. In "The English fled," a black clad archer among the Norman knights is generally interpreted to mean that foot soldiers leapt upon riderless horses and joined in the pursuit, not that William's army contained mounted archers.

In all of these pictures the bows are only shapeless sticks of impossible thickness. Some are longer than the archers who carry them and some are only half their length. In fact, no certain inference can be deduced from them and yet it is on the basis of their appearance that some historians have



Mounted Archer, 1544.—*Monumenta Vetusta*.

assumed that the longbow was not yet invented. To show the absurd kind of statements made by even those who wish to pose as authorities, I will quote a passage from *The Crusades*, by Harold Lamb, at which the author of *Ivanhoe* might have smiled with amused indulgence:

"The five-foot long bow of the English archers did not become destructive until two centuries later. Sir Walter Scott and many other writers err when they place it in the time of

Cœur de Lion. The European archers of the Eleventh Century carried three-foot bows."

Just what part the bow played in the internal subjugation of England after the Conquest can only be conjectured but it seems to me to be likely that the need of suppressing sporadic uprisings in different places led to the development of a sort of light cavalry, armed with the bow. It is true that the archers at Hastings were foot-soldiers, and so were the majority in all future wars, but when the Norman kings of England had become so firmly set on their insular throne that they were able to send troops back across the channel to fight in France many of them were mounted. It has been said that the short composite bow of the East had its origin in necessity from the fact that the semi-nomadic tribes of Asia were horsemen and that on horseback a longbow of wood could not be used. This is not true, as recorded history conclusively shows.

The next thing that arrests us in this perambulation through the past is not of warfare at all. It is a single figure, one which is as much a part of archery as Santa Claus is of Christmas: ROBIN HOOD.

Does there live a person of English blood who has not heard that name? I seriously doubt if there be any other in the whole history of Great Britain that is so widely known. Thousands might use it in their daily speech who never heard of the monarchs he defied. There must be something more at the bottom of this unrivalled universality of fame than appears on the surface and I will put before you the results of my speculations, after which you can naturally form your own opinions.

The regular tale, as worked up from the old ballads and legends and told in modern lives of Robin Hood, is that he was an outlaw living from the reign of Henry II, which ended in 1189, through the twenty-seven years of Richard the Lion Hearted and John Lackland, till his death in 1247 during the reign of Henry III.

He dwelt chiefly in Sherwood Forest, was particularly hunted by the sheriff of Nottingham, was taken sick and went for treatment to Kirklees Priory of which his cousin, Elizabeth de Stainton, was prioress. She treacherously bled him to death, but just before he died he blew a feeble blast on his horn, Little John broke in and at Robin's request handed him his bow and an arrow. Robin shot through the open window and they buried him where the shaft fell.

The priory still exists and the window is shown to visitors, so is the room where he died, which contains a few pieces of ancient furniture said to have been there at the time. An enormous tree, called "Major Oak," is still standing in Sherwood Forest, under which his band is said to have gathered.

His tomb is there and the inscription reads:

HEAR UNDERNEAD DIS LATIL STEAN  
LIES ROBERT EARL OF HUNTINGTON  
NEA ARCIR VER AZ HIE SA GEUD  
AN PIPL KAULD IM ROBIN HEUD  
SICK UTLAWZ AZ HI AN IZ MEN  
VIL ENGLAND NIVR SI AGEN

Obit 24 Kal. Dekembris 1247.

Of his aiding the poor by robbing the rich and of his superhuman powers of marksmanship so much is known that I need not dilate upon it here.

Now let us consider the evidence of early English literature. The oldest mention of his name occurs in the second edition of *Piers the Plowman*, the date of which is about 1377. The character called Sloth says:

"I can noughte perfytly my pater-noster, as the prest it syngeth:  
But I can rymes of Robin Hood and Randolf Erle of Chestre."

This Earl Randle, or Randolf, was a real man who lived during the reigns of Richard, John and Henry III.



The next mention is by Andrew of Wyntoun, about 1420:

“ Lytel Jhon and Robyne Hude  
Waythmen ware commendyd gude;  
In Yngilwode and Barnysdale  
Thai oysyd all this time (about 1283) thare trawale.”

This man sets the time of his activities as being thirty-six years after the date of death as given on the tombstone, but that is not to be wondered at as he wrote so long afterward.

About 1450 Walter Bower wrote in Latin that in 1266 that most famous outlaw Robert Hood and Little John appeared, about whom the common people love to sing and make plays.

Of the ballads themselves the oldest one does not go beyond the early part of the fourteenth century and most of them are a hundred years or more later than that. Undoubtedly there were a great many popular songs and stories of him all through England and the Lowlands of Scotland, some of which were gathered together in later poems.

Such a man may really have lived but, if he did, I believe that the name was a soubriquet bestowed on him from some earlier figure whom he was popularly supposed to resemble. If we search our old rhymes critically we can see that the tendency to personify things and events is both ancient and universal. The Greeks did it continuously, for example the excavations in Crete have shown that the story of Minos, the bull-headed monster of that island who devoured the maidens of Greece, arose from the fact that the Cretan pirates stole Greek girls to be trained for bull fighting. Just so Jack and Jill are almost exactly the ancient Scandinavian names for the tides, bringing their pails of water and breaking their crowns. The rhyme is all that is left of some old nature worship. Punch and Judy are said by some to be the attenuated remains of Pontius Pilate and Judea, from former misterie plays. There are innumerable examples of this sort of thing.



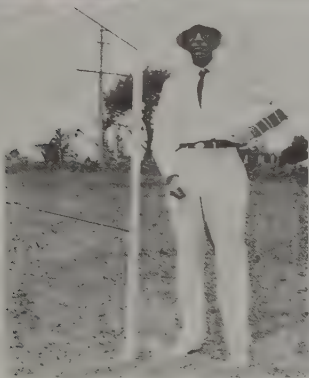
*Robin* is an old Teutonic name associated with elves, sprites, spirits of mischief and the like. The English form which has come down to our time is *Robin Goodfellow*. In the prologue to *Piers the Plowman* it was *Roberdes Knaues*, or Robert the Knave. In German it is *Knecht Ruprecht*. It can therefore be easily seen that some frolicsome sprite of the woods, playing harmless pranks on everybody, might be called Robin.

The second name couples to it a similar idea in more solemn form. *Hood* and *wood* were interchangeable forms of the same word in some parts of England, both meaning wood. Hood is also the same as the older form of Odo, which in modern German is the familiar name Otto, and Odo is merely another way of saying Woden, the great god of the North whose name is perpetuated in our Wednesday. In old mythology, as a specialization from the omnipotence of Woden and as a derivative of his name, a god of the wind was named Hod.

As we see about us to-day the concepts of religion are easily confused in the minds of the vulgar. Even before the Conquest all reverence for the old deities of the North had been wiped out of the Saxon by Christianity and with the introduction of the Latinized religion of the Norman they would be despised by the upper classes.

From this basis arose the concept of a Robin Hood, supreme in the forests hidden from the conqueror's eye, helping the poor who were of his race and robbing the wealthy foreigners; as unsurpassed in the use of weapons as was his godly prototype and yet as full of mischief as an elf. If some bold fellow broke loose from legal restraint, took to the forest and lived that life would he not be given that name? I think he would, and I venture to say still further that if it were possible for someone to live that life in the midst of our civilization he would get the same name to-day.

For some evidently good reason, which I do not know, the British antiquaries attach no importance to the tombstone. It



# HITTING THE WAND AT 100 YARDS

National Tournament at Rome, 1925

CURTIS, LAKE

MANG

JUDGE BALL

WALKER, NEILD, BRUSH, CURTIS, LAKE

JUDGE DAVIS

PALMER, Winner

LAGAI



must have been put there much later than the time it mentions. At any rate there is no genuine suggestion that Robin was a nobleman until the definite date of 1615, when he was made so for the dramatic purposes of a London pageant.

I am one of those who believe that Shakespeare was unable to sign his own name, as he was never known to do so when required by law, but in speaking of the plays popularly ascribed to him it is at least convenient to give him the credit of authorship whether one really believe it or not. It is much the same with Robin Hood. Even though we know that Friar Tuck and Maid Marion and the rest of the characters appear at various later times like actors coming on the stage, taking their places as the stories grew, and though we even question his corporal existence, his character is so unique and fascinating and time has woven the fabric of his exploits into so firm a tissue that we are tempted to illuminate with the lantern of proof his reputed feats of skill. That he shot a mile is rot, though the companion story that his horn might be heard at that distance could easily be true in proper atmospheric conditions. Almost equally absurd is the belief that he could shoot an arrow into a target at one hundred yards and split it with another, although this feat has been done accidentally by many a man. On the other hand his splitting a wand at the same distance is duplicated at many of our National Tournaments at the present time. The only error of the ballads is in making the assertion that Robin could do it every time, without fail.

Perhaps I was guilty of a slight chronological error in bringing him into our story so soon, because other things that might have been mentioned had taken place in the archers' world before his time, but they are few in number and of such a martial character that they readily fall in line when we now return to a discussion of military affairs.

It is evident that archery maintained a strong position after the Conquest, for though its use in England is not mentioned,

yet we do know from the chronicles of the first crusade that considerable numbers of English archers were on that expedition in the pay of Robert of Normandy, specifically mentioned as Angliæ. That was thirty-one years after the Conquest. It was during the time of this crusade that Sir Walter Tyrrell shot King William Rufus while he was hunting.

The first battle with a foreign country in which bows and arrows are mentioned was called the Battle of the Standard, getting its name from the English banner, though for what special reason I cannot say. It was against the Scots, under King David, in 1138, at North Allerton in Yorkshire. Measuring on the map I find that this is seventy-five miles from the nearest point on the Scottish border, showing that England was deeply invaded. The English army was led by the Archbishop of York. Roger de Hoveden was the chronicler who has left us the best account of it, writing about as much later in time as we are now from our Civil War. He said that the English archers, by their thick clouds of arrows, contributed in a large degree to the success of their side.

A book like this, written by one whose mind is as biassed in favor of archery as mine is, can easily be made misleading by mentioning nothing but the successes of the bowmen of history and omitting their defeats. The bow was by no means an omnipotent weapon. Think how the Crusaders won battle after battle against thousands of skillful archers armed with the best bows in the world! Even in the battles of the Hundred Years' War only two of the three great victories of which the English have been justifiably proud for half a millennium were won by the archers acting only as bowmen.

So it was in the Scotch wars of the fourteenth century and just before, where archers were employed on both sides. At Falkirk, in 1298, the English cavalry rode the Scottish archers down, and at Bannockburn, sixteen years later, the English archers were taken in the flank and routed. Yet on the other hand at Falkirk the English archers broke up the close Scottish

formations and allowed the cavalry to act. As in all wars the utility of the arm depended mostly on generalship.

The hey-day, or high-day, of the English archer was the period of the series of conflicts with France, interspersed with truces of a few years at a time, which began in 1340 and, because it dwindled out about a century later, was called the Hundred Years' War. It was an attempt of the Plantagenet kings to retain their continental possessions and in those days of poor means of communication and inadequate resources of men and money it was more difficult for England to hold together a scattered empire than it is now.

The three great victories in which the archers figured pre-eminently were Crecy, Poitiers and Agincourt. Every historian agrees that if the bow won any battles for England it did it there and this unanimity of opinion tempts one to an analysis of just what its services were.

The first of these engagements was at Crecy, a little village about fifteen miles from the British Channel. The English had gone into camp and had the advantage of consolidation while the French were marching on them in more or less disorder from Abbeville, twelve miles south. It was therefore a case, as were the other two battles, of the English having the choice of position and being able to use all of their men while the French had to get to them through natural obstacles with comparatively small numbers at any given moment.

Just as Victor Hugo begins his classic description of the Battle of Waterloo by telling us to think of the letter A so the easiest way to remember the formation of the English troops at Crecy is to think of the letter W, with a dash under it. The English were on the forward slope of a hillside. Each of the four long legs of the W was composed of archers, of whom there were eleven thousand altogether, and at the two apices, which should be thicker and heavier than the letter suggests, were solid bodies of dismounted knights and men-at-arms. The whole English force was twenty thousand and the



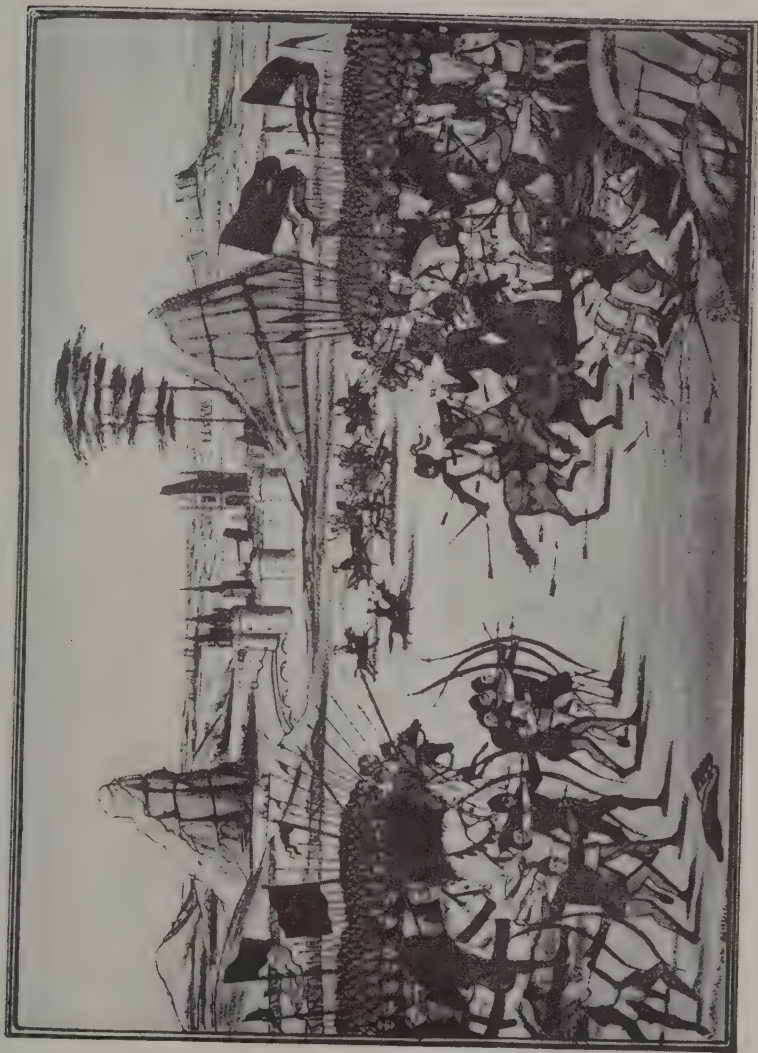
whole French army was sixty thousand, outnumbering our boys three to one. The — below the W represents some reserves held farther up the hill.

It is evident that the French morale was bad from the start. King Philip ordered the army to close up and camp for the night about a mile in front of the English but they would not obey him and he was forced to order an assault even though the day was late and nearly all of his troops were still on the road. Like the good patriot he was he sent the foreigners in first, six thousand Italian crossbowmen from Genoa. At this juncture Providence sent down a severe thunder-storm to wet the thick gut strings of the crossbows so that they would not shoot so well. When the rain stopped, during which the English had doubtless kept some dry strings in their pouches, the two species of arcate artillery let fly at each other and the crossbowmen were quickly driven from the field.

The love of brothers did not exist between the Genoese and the French and when the arblasters turned and sped down the hillside it so enraged the first line of Gallic nobility, who were waiting on horseback to see them die on the field for the glory of the lilies of France, that they lost their temper, charged on the fleeing fugitives as though they were the enemy and in a few moments converted the first two lines of battle into a seething and disordered mob. Think what a target that was for a ninety-pound bow and an eight-shilling arrow!

The loss of this battle was partly due to the psychology of the French chivalry. In the first place they gave the battle a hopelessly bad start by charging the Genoese and then as each rank, or rather body of knights, came up they would charge the masses of men-at-arms and knights of their own social station, who had the most flags and nearly all the insignia of heraldry, and in so doing run between the lines of archers and be shot to death. Altogether the French made sixteen charges and the fighting continued till nearly midnight, by which time the French were almost annihilated. After the





THE BATTLE OF POICTIERS  
FROM AN EARLY EDITION OF FROISSART'S CHRONICLES



battle King Edward's heralds counted 1,542 men of gentle blood; the rest were not worth bothering with. The English lost only fifty.

This was *par eminence* a victory of archers and nearly all of the fighting was done by them.

Crecy was 1346 and Poitiers was just ten years later, 1356. The Black Prince had landed at Bordeaux, like so many of our American troops in the World War, and had gone far up into central France collecting booty.

On the way back the French King John caught him at Poitiers and forced him to either fight or leave his wagon trains of spoils and flee. Of course he chose the former alternative although he had sixty-five hundred men and John had sixteen thousand.

The Prince showed his good judgment by selecting a strong position and letting the French have the handicap of attacking in the open. This is where the value of archery came in. If an army fought with swords, maces and spears it had to get out in unimpeded ground to do it but archers could get among the trees and shoot out. He therefore formed his lines in the edge of a wood, with a hollow in front.

The French generalship was rotten. For the first charge John sent a mixed body of mounted men and crossbowmen. The result was that as soon as the riders became excited they sped up their beasts and got ahead of the arblasters so that the latter could not shoot without hitting them in the back. At the very outskirts of the wood was a hedge behind which the archers were concealed and through which they shot. When the mounted men came within good range, which I imagine in this case was nearer than usual, they were brought to a standstill by such a volley of arrows as those seasoned veterans knew how to deliver. In the meantime a file of archers had drawn out to the left where they could sweep the hollow and poured a cross-flight into the enemy's flank.

Although this first assault was routed, the second line im-

mediately came up. For some reason the King had ordered all the rest of his cavalry to dismount and fight on foot, thus losing the speed and force of a mounted charge. These men were therefore infantry and though they moved more slowly they were of vast numbers. Again the hedge was held as the volleys of death sped out of it but the fighting became hand to hand in places and before the Prince had rolled back the attacking forces he had used all but four hundred of his men.

If the third line of French had been under a Napoleon and had come up at that psychological moment, fresh and brave, *Nike* would have hung her garland on their banner, but the Duke of Orleans, who commanded it, was so stricken with fear at the rout ahead of him that he led his whole division off the field without striking a blow. There was still the fourth and last corps, commanded by the King himself. On it came, the flower of the chivalry of France, threatening to overwhelm the hard fighting band which still held the hedge. Here it was that the Black Prince carried through one of those thrusts which are inspired only by the genius of the born fighter. Weakened as his forces were he detached a band of fifty knights, badly as he needed them at the front, to circle about to the King's rear and divert him from behind, knowing from his years of fighting with the French that in confusion their discipline would be lost. The stratagem was successful and in the end the force was killed or captured to a man and the rest of the demoralized and dispersed army was pursued by the victors till nightfall.

This battle also was won largely by the archers but at the same time the other branches of the service did all the fighting that human beings could be called on to do.

Agincourt was the last of the big battles which are popularly supposed to have been won by archers. It was fifty-eight years after Poitiers and the personnel had entirely changed. Altogether there were ten kings on the two thrones during the Hundred Years' War.

The name A-gin-court is familiar to me because a wealthy liquor dealer near my home gave it to his estate, quite unwitting of the pun. The real French village is very near the position of the British front in the World War.

The battle took place in a deep defile between two forests. Henry V, of England, had only one thousand men-at-arms, six thousand archers and a few thousands of other footmen. The French had more than four times as many. As in the other battles the English awaited the attack and the archers fixed the pointed stakes, which they carried at this period, into the ground to ward off cavalry charges. As at Crecy a heavy rain fell and added much to the advantage of the English as it not only wet the crossbows again but, which was much more important, turned the bottom of the valley into a slough of mud through which the footmen had to labor with great difficulty and which prevented the bringing up of the cannon which had begun to be used in warfare.

As the French showed no disposition to begin hostilities the English archers moved up close enough to get within range of the French cavalry and throw a few flights of arrows into them. This was more than they could bear in stolidity and they charged up the ravine, but the archers feathered into them from both sides and they were turned back in confusion. The great mass of the unmounted men then came lumbering up through the defile, sucking their feet out of the clinging clay, and again the archers pinned them through and through. However their numbers were so great that they finally engaged Henry's men-at-arms and were certainly defeating them, while the archers could not shoot because of the impossibility of aiming away from their comrades. At this juncture they seized their leaden mauls and other hand weapons, ran into the mêlée and, because they were free of weight while the French were sunk deep by their armor they dodged about, striking blows that turned victory to the English. It is hard to understand how it was that when the two sides were en-

gaged in hand-to-hand struggles, as here and at Poitiers, the disparity in casualties was so great. According to the *Britannica* the French lost five thousand men of noble birth while the English lost only thirteen. According to Shakespeare, who got his information from Hollinshed, the losses were greater. In *King Henry V* the lines are:

“ This note doth tell me of ten thousand French,  
That in the field lie slain:  
Where is the number of our English dead?  
Edward the Duke of York, the Earl of Suffolk.  
Sir Richard Kelty, Davy Gam, esquire;  
None else of name; and, of all other men,  
But five and twenty.”

Probably the best picture of English military archery which exists in fictional writing is found in *Sir Nigel* and *The White Company*, by A. Conan Doyle, M. D., books in which the spirit of the days of the Black Prince lives again. Conveyed in language so masterful as to win him a knighthood his scenes take on the value of reality and doubtless serve many imitators. It is therefore justifiable to examine them with a critical and practical eye.

Sir Conan was not an archer but tells us that his technical knowledge of shooting was gleaned from Hastings' *British Archer*, 1831, Hargrove's *Archery*, 1792, and Strutt's *Sports and Pastimes of the English People*. That he chanced on these inferior books and missed Ascham's *Toxophilus* and Roberts' *English Bowman* is unfortunate.

Most of the things he says about bows and arrows are correct, as it is only natural that with a man of earnest purpose truth should preponderate. When he says, “ May I never twirl a shaft over my thumb-nail if —— ” he is speaking the true language of archery and gives evidence of the pains taken to prepare himself. On the other hand a sentence like this, which he has constructed with care, contains several errors,



"How now, youngster? Over-bowed? Put your bow in the tiller. It draws at sixty pounds. If your bow be not stiff, how can you hope for a twenty score flight?" A tiller does not weigh a bow but holds it drawn while the bowyer looks at its curvature, and a sixty-pound bow would not only be very light in war but would hardly cast a war-arrow half of four hundred yards. That two archers could successfully fight a duel at the full distance of their cast, while watching each other's arrows, that a bow which might be drawn by hand would cast farther if drawn on the feet, and that great accuracy is obtainable over two hundred yards are instances of the impossible. It is regrettable that Sir Conan did not submit his manuscript to an experienced archer who might have culled out such little flaws.

The Hundred Years' War ended officially in 1453 but for some time it had been dying out and bands of armed mercenaries had been sent home to England. Probably in the earlier years of this long conflict, as protracted as our American Revolutionary and Civil Wars and all the time between, the best of the English youth had gone forth under the inspiration of true motives of patriotism but long before the final truce was signed the English forces had degenerated in large part into professional soldiers of brutal habits and low moral tone. When these men were thrown back into England they were distinctly out of a job and in a frame of mind where they were willing to fight for anyone who could pay them and for any cause.

At the same time the feudal power of some of the English lords had become so great, while the armies of the King were in France, that they were able to hire the returned veterans and engage in civil war in the rôle of king-makers. Out of such private ambitions arose the Wars of the Roses, beginning in 1455, or two years after the end of the continental campaigns, and lasting just thirty years. It was a time of misery,

when the common people were ignored by the nobility and their rights were forgotten.

From our standpoint these wars sealed the doom of the bow. Military science had reached a stage in its evolution where regimental and technical organization of armies was approaching modern forms. The continental nations had never been good archers and when the powerful English longbow was withdrawn from their battle-fields they ignored its existence and proceeded in their plans with hand weapons and the very poor and ineffective firearms which then existed.

In England the mercenary soldier became so hated that a national professional army practically ceased to exist and for at least a century and a half the kingdom's forces consisted of an aggregation of county levies. It is true that many of these were armed with bows but the army as a whole was so inferior to the forces of France that when the inevitable reorganization occurred the continental standards were adopted and bows were entirely discarded in favor of gunpowder and muskets, which by that time were much improved in construction and efficiency.

Do not get the impression, however, that bows were not the chief arm of the footmen of the Wars of the Roses, because they certainly were. There is a contemporary picture of the battle of Tewkesbury, reproduced in *Badminton*, which shows none on either side but archers and knights, and, as this was the last big conflict of the war, in 1471, it proves that the bow still held its own.

During the reign of Henry VIII the bow still played an important rôle on English soil. In 1513 the bloody battle of Flodden Field, won by the English against the Scotch, was decided partly by archers, because it was by pouring great flights of arrows into the Scottish ranks that the English threw them into sufficient disorder to permit of their being charged by cavalry.

In this battle James IV received an arrow wound, though



### THE MARTYRDOM OF ST. SEBASTIAN

Showing relative length of longbows. From an English manuscript  
in the N. Y. Public Library



it was not fatal, which made the fifth king to be shot with an arrow in England. The others were Harold of Norway, Harold of England, William Rufus and Henry IV, who was wounded in the face at the Battle of Shrewsbury in 1403. I cannot recall that any monarch, either native or foreign, has ever been shot with firearms in England.

An event of tremendous importance to archery occurred in the latter part of this reign, something which forever drew aside the veil which hid its mysteries. It was the publication of that masterly book, *Toxophilus, or the Schole of Shootynge*, by Roger Ascham.

Why some people are in doubt as to the pronunciation of this man's name I cannot see, unless it be that the great number of Germans in the United States whose names contain "sch" have led to the confusion. In English place-names "ham" is like its congener *home*. To hear a man say Ash-am grates on the nerves as much as to hear a Yankee meticulously say Wal-tham. The town of Askham, not far from his early home, undoubtedly was the source of his patronymic and clearly shows how it should be sounded.

He was born in 1515 at Kirby Wiske, a little village in the North Riding of Yorkshire, near North Allerton, where the Scotch and Norman-English fought nearly four centuries before. His education was received at the private home of a gentleman who was speaker of the House of Commons and, fortunately, we can quote Ascham's own account of those days:

"This maketh me to remember the right worshipfull and my singuler good mayster, Sir Humphrey Wingfelde. Thys worshypfull man hath ever loved and used to have many children brought up in learnynge in his house amonges whome I my selfe was one. For whom at terme tymes he woulde bryng downe from London bothe bowe and shaftes. And when they shuld playe he woulde go with them him selfe in to the fyelde, and se them shoote, and he that shot fayrest, shulde

have the best bowe and shaftes, and he that shot ilfavouredlye, shulde be mocked of his felowes, til he shot better."

Sir Humphrey did not actually teach the boys their lessons, but this routine was done by a tutor named Bond. The instruction must have been of a sort to produce the best fruit, for Ascham became a man of such great learning that he held important positions at St. John's College, Cambridge, and elsewhere in the world of letters. He was even tutor to the Princess Elizabeth, who afterward became his queen.

We are apt to picture in our minds these erudite men of olden days as venerable personages with long gray beards and clothed in flowing raiment of velvet and satin, an impression strengthened by their style of speech, which seems to us so quaint. Yet, when Ascham wrote *Toxophilus*, he was a young man of twenty-seven, living in the days when the bow was still used on the battle-field and, though he was never a soldier, probably able to shoot in as strong a bow as the average skillful archer.

The date of publication of *Toxophilus* is given as 1545, but the year before he told Sir William Paget that it was in the press, and the actual writing was done in 1542 and 1543. I am so particular about these dates because they disclose the probable reason for his having written it at all. From his passing over from one year into the next we may surmise that he began his composition in the last few months of the year. If that be so it fits in exactly with the fact that Parliament had just passed an act in September of the same year, which made such a book as his extremely opportune.

This was "an acte for mayntenaunce of Artyllarie and debarringe of unlawful games," requiring everyone in good health, the clergy, judges, etc., excepted, "to use shootinge in the long bowe," and fixing the price at which bows were to be sold. That this furnished his inspiration is made almost certain by the fact that he presented the book to Henry VIII at Greenwich, while the king was in a complacent mood fol-





BUTT SHOOTING IN MEDIÆVAL ENGLAND



lowing the capture of Boulogne, and promptly received the grant of a pension of ten pounds a year, which was equivalent to probably thirty times that much to-day.

From the literary point of view the work is a masterpiece. It was one of the first books to be printed in England in the vulgar tongue, instead of the universal Latin of the learned, and it has been reprinted again and again for its intrinsic merit, quite aside from the special instruction in archery which it affords. I would strongly advise all of my readers to buy one of the copies which retain the original orthography and so enjoy the quaint charm, which is lost when the words are reduced to their present forms.

It is written in the mode of a dialogue between Philologus, a lover of truth, and Toxophilus, a lover of the bow. Of course it is the latter who does all the real talking, Philologus merely being like the interlocutor in a minstrel show whose remarks draw forth the witticisms of the end-men. Sometimes it makes me think of the Westminster Shorter Catechism, on which I was brought up, as when it says:

“Phi. What is the chief poynte in shootynge?

Tox. To hyt the marke.”

When I began to write this book I vowed that I would avoid at least one temptation to which nearly every writer has given way: the quoting of Ascham for line after line. Yet now I find it very hard to keep my resolution. Every page, from cover to cover, is so pregnant with ideas that one is sorely constrained to give them new birth. The book is a complete treatise on every aspect of archery as it was practiced in the sixteenth century and no archer can feel educated in his art until he has read and studied it from beginning to end.

Undoubtedly most of what he said had been part of the common knowledge of archery for centuries before but no man had written it down in systematic form and for our pur-

poses we may treat it as the child of his own brain. For example, it may well be that Sir Humphrey or Tutor Bond taught him that standynge, nockynge, drawynge, howldynge and lowsynge were the main steps in correct shooting on which nearly all details could be arranged but for all of us who have followed him they are known as Ascham's Five Points, and no man has ever been able to make a better classification.

Before we leave the period of military archery in England, let us inquire into the forms of the bow and arrow as they came to be shapen when in their prime, into the range and nature of shooting when it was most skillfully executed and most lethal and into the formations and tactics of bowmen when they were as important in armies as riflemen are to-day.

Practically all of the paintings of the Middle Ages were on religious subjects and were done in monasteries by monks who might have come from any part of Europe, as the brethren were widely recruited and were moved about rather freely among the holdings of their orders. Thus different drawings of a favorite subject like the martyrdom of St. Sebastian may depict him as being wounded by arrows from all sorts of bows and even crossbows. I have seen graceful reflex composites in the hands of Italians, sturdy, practical longbows borne by northern men and, hither and yon, heterogeneous junk varying from futile flimsy withes to weapons like wagon springs that no human strength could draw. The good models evidently reflected the memories of monks who knew archery before they became immured and the others were products of inadequate imagination with no background of experience.

A field for research which as yet is practically unexplored may be found in the illuminated borders of old vellum manuscripts. I have never met a librarian of our great modern collections, as at Philadelphia, New York and elsewhere, who had noticed, or at least given thought to the many little archers who hide in the trailing lines and vines that embellish an initial letter or the edges of an illustrative page. Many a



MARGINAL FIGURES FROM THE WINGFIELD  
*HORAE*





monachal artist who bent over the brush must have been a toxophilite at heart, for, finding beauty in grace of line, he would love the dynamic arcs of bending bow and flying shaft. Though, forced to confinement, he might fail to fling his flanes free in the fields that were framed for him by the fenestrum of his cell, he could at least work his worldly wishes into the grotesque adornments that encompassed the central subject. Such pictures are naïve. The playful creatures who merrily aim at leaf or flower prove archery as it was, for they are the children of knowledge, and as the sprite shoots in fancy so did the man in reality.

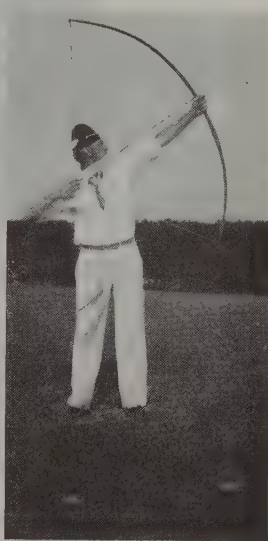
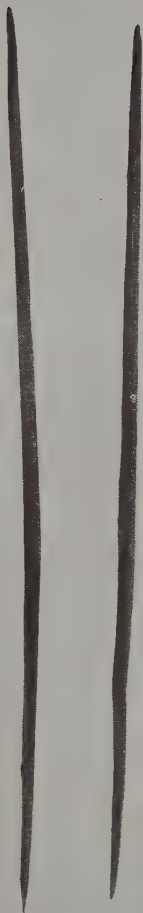
For an example, let us look at a *Horæ et Psalterium*, or Book of Hours and Psalter, in the New York Public Library, which was written in England about 1450 and a century later belonged to a Richard Wingfield whose name both marks it in the catalogue and recalls to us archers Sir Humphrey, the "singuler good mayster" of Roger Ascham. On the borders of a picture of Saul playing the harp, the whole best studied under a magnifying lens, are two such instructive figures. One is a strange creature, a sort of centaur, except that the human portion emerges from the body of a calf instead of a horse. He is shooting at a flower with a crude longbow that has no artificial tips nor reflexion at the ends. The arrow is a heavy bird-bolt, thick of stele and ending in a broad flat head shaped like the bell of a trumpet, suggesting the *maquets* which are shot at wooden birds in modern Belgium. It would measure twenty-eight inches or slightly more if the archer were enlarged to the size of a normal man. The feathers are long and triangular. Most important of all is the manner of draw, which is directly under the chin and right eye as we shoot to-day. Since many writers have claimed that this method was invented by Horace Ford in the middle of the last century, it is of scientific interest to see it shown here at least five hundred years earlier. The draw or loose is clearly of the three fingered type. As a whole the verity of the compo-

sition is impressive. The face is so lifelike and unflattering as to suggest portraiture, the drawing elbow is high and well back, the shoulders are working and while the arrow shows for its whole length it still seems as though it may have been meant to be on the left side of the bow as the latter is left uncolored, or transparent, at the crossing.

The other picture is of a pink skinned naked child with his back toward us and with a cascade of curly yellow hair bound about with a fillet of blue. In a profusion of brilliant foliage he strains at his daddy's bow, nearly a third longer than himself, in an effort to launch the queerest arrow I have ever seen. It is a thick rod, apparently unfletched, having a pin or peg on the end which serves as the axis of a windmill. This revolving terminal is made of two flat sticks crossed and perforated in the centre, with white stiff rectangular flags, presumably of parchment, fastened to the four ends. I made one out of tongue depressors and stiff paper and found it to be a first rate toy. If the arrow were shot upwards the mill would revolve with a whirl, stay up in the air as the heavy shaft dropped out and go coasting about like an autogiro. That monk should have been a father.

I believe that in England there were at least three chief kinds of arrows used for war, which in turn might have been further differentiated by variations in shape, fletching and heading, but, so far as I know after inquiring of the British Museum and other places, only a single specimen now remains. In 1832 Sir Samuel Meyrick, an authority on weapons, reported to the *Gentleman's Magazine* that he owned an old English war arrow and commented on it as follows:

"That in the armoury of Goodrich Court is twenty-eight and a half inches long, has a wide nock like the Turkish arrows, not being of bone or horn but merely cut in the wood, which in fashioning the arrow was left to project on each side to give it substance, and the shaft is further made to swell about one-third from the point, and the barbed pile is not put



PHOTOGRAPH OF TOWER BOWS  
CLOTHYARD SHAFT DRAWN BY PAUL WILCOX



on with its socket flush with the wood, but with what is technically termed a shoulder, in order to give timely warning to the archer when to loose, that he might not overdraw the arrow."

This arrow seems very likely to have been a genuine one, as the description of it tallies exactly with all the disconnected statements in *Toxophilus* that might be applicable to the sheaf arrow, or standard arrow that was furnished to soldiers. Of arrow-heads for martial use Ascham says: "Our English heades be better in warre than brode arrowe heades," and he adds that they are light, flat and supplied with little barbs which, he thinks, might well be left off. I have also seen and shot with reproductions of heads made for piercing armor which were edged, though thick and narrow, and ended in obtuse, though sharpened, tips.

Since Ascham said that sheaf arrows should not be so long as they were generally made, we may surmise that the majority measured more than Meyrick's, as they could hardly have been much shorter. This supposition is borne out by the one existing arrow to which I referred, which was found in a tower of Westminster Abbey and, I am told, is now preserved in the chapter house there. In length it is thirty and one half inches, the head has been barbed, and the nock is plain but, what is most interesting, there is a slit cut at right angles to it to receive a reinforcement of horn or raw-hide.

Flight arrows are positively known to have been carried by soldiers, Hansard giving the proportion as six or eight in a sheaf of twenty-four. Their construction cannot be ascertained but, no doubt, they were long, light, low fletched and small of head.

The third kind of arrow and the most fascinating to conjecture about is the famous cloth yard shaft of ballad and story. The following lines from *Chevy Chase* give a good idea of the way in which it is usually mentioned:

" An archar off Northomberlonde  
Say slean was the lord Perse,  
He bar a bende bow in his hande,  
Was made off trusti tre.

An arow that a cloth yarde was lang  
To the hard stele haylde he,  
A dynt that was both sad and sore  
He sat on Sir Hewe the Mongon-byrry.

The dynt yt was both sad and sar  
That he of Mongon-byrry sete,  
The swane fethars that his arrowe bar  
With his hart blood the wear wete."

In the past, since the measure was lost to common knowledge, most of the writers who mentioned the cloth yard, whether from the standpoint of literature or of toxophily, simply accepted it as the standard yard of thirty-six inches. Others, including myself, thought that it was synonymous with the Flemish ell, or *el*, of 27.08 inches which, with a head attached, would equal the length of a modern arrow. Both of these theories were wrong and we can now assert with conviction that the true length of the cloth yard was thirty-seven inches.

The reasons and proof may be summed up like this: For the improvement of the cloth industry in England, Edward III imported a goodly number of Flemish weavers, that being the one fact that led us formerly to accept the Flemish ell as the length in question. Here, by the way, let me speak of the ell in general. The word is from the Old English *eln*, meaning forearm, which is retained in *elbow* and is analogous to the Latin *ulna*. It was an indefinite term, applied to many lengths from the Saxon ell of about eighteen inches to the Jersey ell of forty-eight. The ell which was equivalent to the cloth yard was the Scottish.

An almost universal error is to suppose that linear meas-



ures were derived from the human anatomy, as the foot, thumb, palm, pace and so on, whereas, in reality, they are of immemorial antiquity and mysterious origin and have differed scarcely at all through the known experience of mankind. The application of parts of the body to them has been merely for incidental convenience.

The oldest unit of which we have knowledge is the cubit of 20.62 of our inches. By it were built the Great Pyramid of Egypt, equally old buildings in Babylonia, six prehistoric stone circles in England, where it was modified to 20.55, and, almost incredibly, stone cliff dwellings of New Mexico. Nearly all other measures seem to have been derived from this, either by dividing it into various fractions or by applying a like process to the diagonal of its square. Thus, three-fifths of the original cubit or, even more exactly, of its northern form of 20.55, give a length of 12.33 inches. This modulus was widely used in what is now northern Germany and its vicinity and was called the Rhineland foot, its yard being thirty-seven of our inches.

The Flemings may have been accustomed to the use of the Rhineland foot and the derivative yard and so have popularized it in England as a measure for cloth, although, of course, it may have come in by any other way. In a list of old English measures that have been annulled, the *Encyclopædia Britannica* gives: "The yard and inch, or 37 in. ell (cloth measure), abolished after 1553." To verify this I wrote to the U. S. Bureau of Standards and to the



Archer at Battle of Shrewsbury. — Cotton MS. Julius E.

Standards Department of the British Board of Trade. The former quoted Nicholson's *Men and Measures* in indirect

corroboration and the latter said: "The Department have no record of the length of the 'cloth yard shaft' as such. There appears to be little doubt, however, that the 'cloth yard' was of 37 inches." Until very recently its actual use was continued, though unwittingly, by a general custom of placing the thumb at the end of a standard yardstick when measuring cloth.

This great length would bear out the sense of the old allusions to it, where, invariably and obviously, it was meant to be a shaft of the greatest practicable magnitude, shot by only the strongest archers. Notice that the one that slew Sir Hugh Montgomery was fletched with feathers of the swan, which would be longer, stiffer and more suitable to its size than the usual pinions of the gray goose.

Of the myriads of old English bows only five are now known to exist. One is the Flodden Bow, described on page 117. Another is Little John's Bow. This is a single piece yew, six feet seven inches long and about five inches in girth at the grip, which is without arming. It is estimated to weigh from ninety to one hundred pounds for a twenty-eight-inch arrow. It is at Cannon's Hall, near Barnsley, and has been in the Stanhope and Spencer families for at least three centuries. Tradition says that Little John was buried in Heather-sage Church, on whose wall this bow used to hang, and on opening the grave ascribed to him a thigh bone twenty-nine and one-half inches long was unearthed. That some local giant who was nicknamed Little John was buried there I have no doubt and this may well have been his bow. It certainly could shoot a thirty-seven inch arrow. It is reflexed, possibly by heat, has a round belly and nearly flat back and is correctly proportioned for sap and heart wood.

The other three bows were recovered in 1841 from the wreck of the *Mary Rose*, which was sunk in the Thames in 1545, two years before the death of Henry VIII. One is at the Royal Service Institution and the other two at the Tower.

To get first hand information about those at the Tower I wrote to Sir Charles ffoulkes, Curator of the Armouries there. He most courteously sent me a photograph of them, accompanied by a letter from which the following extracts are taken: "The measurements are: the longest, 6 ft. 4 ins. by  $4\frac{3}{8}$  ins. at the centre, and the shorter, 6 ft.  $2\frac{1}{4}$  ins. by  $4\frac{3}{4}$  ins. It always seems to me that they are too thick and it is quite possible that these bows, which were in store, were more or less in the rough and were thinned down before use. I think you are right about the measurement of the shaft and that it was 35-37 ins. long. With regard to the Bowyer Tower, we have only the tradition but I think it quite certain that the name was given to it because it was used for this purpose" (for making bows).

Viscount Dillon, in *Badminton*, adds that the section is a flattish arc on the back and an almost semicircular one on the belly, the wood being close grained yew with knots four or five inches apart. In spite of Sir Charles' feeling that the bows are too thick, an observer who had seen both said that they were distinctly weaker weapons than the Little John Bow. Dr. Pope once made an imitation of the larger bow which weighed sixty-five pounds at twenty-eight inches and seventy-six at thirty-six. It cast flight arrows 225 and 256 yards at the two draws.

It seems that the average length of the longbow was from two to seven inches over six feet, varying to take appropriate arrows of from thirty to thirty-seven inches.

For drawing mediæval bows the fingers were always used, never the thumb. Only two fingers are on the cord in many of the old pictures but many others show three and the full number would almost certainly be needed for the heaviest bows. Ascham takes the latter for granted in the following sentence: "When a man shooteth, the might of his shoote lyeth on the formooste fynger, and on the Ringman, for the myddle fynger whiche is the longest, lyke a lubber starteth

backe, and beareth no weyghte of the stryng in a maner at all."

The drawing point, or place on the archer's body at which the nock is stopped, was not always the same. Arrows of twenty-nine inches or less might have been drawn under the chin, as in the case of our little centaur, but longer shafts needed to be drawn either beside the face or toward the chest. The great length of the cloth yard shaft permitted only two draws, to the ear or to the right pap. I can draw Chinese arrows of that size to either of those points, but not under the chin without a loss of several inches of the stele. Ascham said that he "never red of other kynde of shootyng than drawing wyth a mans hand ether to the breste or eare," but, while he quotes Homer as saying of Pandarus that "Up to the pap his stryng dyd he pul," he adds that "Nowe a dayes contrarye wyse we drawe to the ryghte eare and not to the pap." By drawing to the ear "men shoote bothe stronger and longer: drawynge therfore to the eare is better than to drawe at the breste." The only good reason for drawing to the breast is to get an easy elevation for long ranges. In such crude representations as the Bayeux Tapestry the breast draw may be merely due to the graphic limitations of the artist.

The forty-one years from Henry's death to the invasion of the Spanish Armada, in 1588, saw the disappearance of the bow as a weapon of the first importance and its place taken by firearms. In the early years of Elizabeth's reign a company of one hundred men contained only twenty archers, the rest being equal numbers of pikemen and arquebusiers.

In 1572, by act of Parliament, a return was made of the number of yew bowstaves which were imported and the places where they came from. It is astonishing to find that the total was ten thousand, and this in a period of decline. It tempts one's imagination to think how great was the number a century earlier. As the staves came from the northern ports of

Emden, Dordrecht, Sonderburg, Hamburg, Denmark and Cologne they indicate the free growth of the wood in those high latitudes and show how naturally the Nordic races whom we suspect of having used the yew longbow in the first millennium came by their supply of suitable wood. However, it cannot be successfully maintained that a plentiful supply of yew is enough to make the inhabitants of a region a race of archers, as the best in Europe grows in the mountains of Spain and Italy where a love of the bow has not existed within historic times.

The danger to England from the Armada was so great that every force was mustered, very much as in the general draft of the World War, and an accurate survey of her man-power was thus made available. It appears that out of ten thousand men supplied by London only eight hundred were archers and even these were wholly from the untrained forces. Four counties had no bows, most of them showed archers in a small minority and only in Oxfordshire and Buckinghamshire did they still predominate.

Apparently inspired by what seemed to him the incompetence of those in command at a gathering of the defending forces at Tilbury, in the summer of 1588, a knight named Sir John Smythe wrote in 1589 and had published in 1590 a book of criticism whose half-page title may be condensed to —*Certain Discourses on the Mosquet, Caliver and Long-bow*. It is the only work I have read which gives a detailed account of English military archery by a soldier who saw it in use. As he speaks of having seen service in France in the time of Edward VI, which meant 1549–50, he was probably a man of about sixty. He strikes one as having had conservative ideas, a cranky disposition, a well informed mind, a good faculty of observation and a considerable knowledge of archery. The book was suppressed by the authorities within a fortnight of its publication and so is exceedingly rare, my copy having been discovered and presented to me by my warm



friend and classmate, Colonel Noel Bleecker Fox of New York, himself an authority on the history of warfare. As the musket of that time was so heavy that it had to be rested on a fork, as the ball would roll out if the muzzle were lowered and as the effective range was not above sixty yards, the arguments in favor of the bow seem to me to be very just.

The following answer to those who condemn the bow gives us valuable information: "The imperfections of the Long bowe, doo consist onlie in the breaking of the Bowe or bow-string, for the which in times past (when there was great accompt made of Archerie) there was speciall care had, that all Liveray, or warre Bowes being made of the wood of Yewgh, were longer than now they use them, and so verie well backed and nocked, that they seldome or never brake: Besides that, the Archers did use to temper with fire a convenient quantitie of waxe, rosen, and fine tallowe together, in such sort that rubbing their Bowes with a verie little thereof laid upon a wollen cloath, it did conserve them in all perfection against all weather of heate, frost, and wet; and the strings beeing made of verie good hempe, with a kinde of waterglewe to resist wet and moysture; and the same strings beeing by the Archers themselves with fine threed well whipt, did also verie seldome breake; but if anie such strings in time of service did happen to breake, the soldiers Archers had alwaies in readines a couple of strings more readie whipt, and fitted to their Bowes, to clappe on in an instant. And this I have heard of divers Yeomen, that have served as soldiers Archers in the field."

Of the cast of war bows he speaks explicitly, naming 160 to 220 yards as proper ranges for distant shooting at advancing troops. As is mentioned later in the chapter on flight shooting, he adds a marginal note that some archers with their flight shafts can shoot 400 to 480 yards, evidently citing the greatest known length or else stretching his imagination.

His knowledge of the awful terror of a flight of arrows is



shown by such descriptions as these: "The volees of Archers arrowes flying together in the ayre as thick as haile do not onely terrifie and amaze in most terrible sort the eares, eyes and harts both of horses and men with the noyse and sight of their comming, but they also in their discents doo not leave so much as one man nor horse unstricken." "Archers being in so great numbers doo dimme the light of the sunne, darken the ayre and cover the earth with their volees of arrowes, eight, nine, ten and eleven scores distant from them."

To understand the next quotation, which shows how archers were best arranged in battle, let us consider the word *herse*. Originally it seems to have meant a criss-crossing of poles. If it were dragged on the ground it would make a harrow, which is the present meaning in French and the old one in English. In fact, Conan Doyle mentions a harrow of archers. If the poles made a stretcher for the dead they would give our modern sense in English, transferred in turn to a cart, a funeral carriage and an undertaker's automobile. In a *herse* of archers the criss-crossing was by the ranks and files, the men being conveniently separated in rank and offset in file, like the teeth of a harrow, to give clearance for shooting. So:

"The ancient order of reducing Archers into forme by our most skilfull and warlike ancestours, was into hearses, that is, broad in frunt, and narrow in flanck, as for example, if there were five and twenty, thirtie, five and thirtie, or more or fewer Archers in frunt, the flancks did consist but of seven or eight rancks at the most: and the reason was this, that if they had placed any more ranckes than seven or eight, the hinder ranckes of Archers should have lost a great deal of ground in the volees of their arrowes at their Enemies."

Just three years before the Armada threatened to disrupt the world, in 1585, the Honourable Artillery Company was formed. The citizens of London had been called out so often to musters that they became wearied and to reduce things to

a more systematic basis a number of men who had been in the army volunteered to instruct others and thus form "Trainbands." Although its fortunes were sometimes at a low ebb the company has never ceased to exist and it is at present the earliest representative of the English standing army. Their first grounds were near Bishopsgate, which Artillery Street and Artillery Lane now identify, but in 1640 they moved to a new field which is still, in the heart of modern London, known as the Artillery Ground. In the beginning the organization had included an Archers' Division and it is very likely, indeed almost certain, that into this branch archers who had previously been known as the Fraternity of St. George were absorbed.

So far as is known the last two appearances of the bow in warfare in the British Isles were both in Scotland, the first in 1644, when the Royalists used it against the Covenanters, and in 1688, at a great clan battle between those representatives of the Irish and Scandinavian strains, the MacDonalds and the MacIntoshes.

It may surprise many archers, certainly most Americans, to learn that some of the ancient gilds, or guilds, or misteries, or companies, that carried on the crafts connected with archery in mediæval times are still in existence in London. Of seventy-seven gilds, of all sorts, the Bowyers stand thirty-eighth and the Fletchers thirty-ninth in order of precedence. Neither of them make bows or arrows, nor have they done so for time out of mind, but they exist as corporate bodies in order to retain possession of old investments. From such sources, the income of the Bowyers is about seven hundred pounds and of the Fletchers about one hundred, neither looking very impressive beside as much as fifty thousand for the richest companies.

Having written to the Clerk of the Worshipful Company of Bowyers, I received a courteous and interesting letter from which the following quotations are taken:

“The Bowyers (Long Bow makers) and the Fletchers (Arrow makers) formed one Company for many years, but separated in 1370. There is no record to show when these Guilds were actually founded and they were Companies by Prescription.

“The Bowyers were granted a Coat of Arms in 1488 (4 Henry VII) : Sable upon a Chevron or, three Mulletts pierced between three floats argent, and for a Crest, Three bows bent Gules stringed or; but it was not until Archery began to decay that James 1st being willing as much as in him lieth ‘to recontinue and restore again the Antient and laudable exercise of Archery with Long Bowe’ granted a Charter of Incorporation in May, 1621, to the Bowyers of London in the name of ‘The Master, Wardens and Society of the Mistery of Bowyers of the City of London’ and it is as such a Corporate Body that this Company still exists.

“The Company now exists as one of the City Companies unconnected with its Ancient trade for obvious reasons but we provide prizes for Rifle Shooting in the army and (as you have noticed) Gold Medals for Archery.

“The Members of the Company are elected from time to time and generally are related or connected with existing Members of the Court or Livery.

“Under the Will of a Bowyer who died in 1629 the Company dispenses certain Alms and provides Exhibitions for poor scholars at Oxford and Cambridge Universities.

“Before the Great Fire of London, 1666, this Company had a Hall in the Ward of Cripplegate at the corner of Hart Street and Monkwell Street but the Hall was destroyed in the fire and not rebuilt—since then the Company has had no Hall but meets (at present) at the Café Royal in Regent Street.

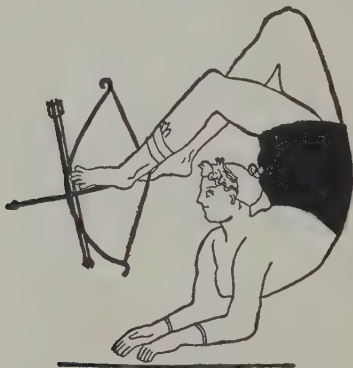
“The Fletchers Company has never been incorporated by any charter—their Hall once stood in St. Mary Axe but was

burnt down and never rebuilt—they possess no ancient records and I believe have no existing entries prior to about 1775.

“The Stringers or Long Bow String Makers and The Arrow Head Makers have long since ceased to exist—but as late as 1722 the Stringers made proposals to the Bowyers for being admitted into the latter Company.

“I have been Clerk to The Bowyers Company for 31 years and there have been only 11 Clerks since the Great Fire, not a bad average.”

NOTE.—“The floats were one sided files for smoothing the wood of the bow staves.” The picture of one in Webster's Dictionary shows a short, broad rasp with a handle on the back like that of a flatiron,



A Roman Acrobat.

## II

### ARCHERY AS A SPORT IN BRITAIN

So long as the bow was one of the chief weapons of the English armies its use was naturally encouraged to the greatest extent by the reigning monarchs and their officers of state. Very much as the framers of our constitution of the United States expressly provided that no citizen should be denied the right to bear arms, so, in every age, the men of England were permitted to shoot with the bow and arrow, it being thought that proficiency in times of peace meant similar readiness and skill in time of war. During those many centuries the bow was in every man's house and archery was by far the most widely diffused and popular sport in the kingdom. After firearms became the sole weapons for long distance offensive and the bow was no longer a national necessity, archery, pursued solely as a sport, naturally fell tremendously from its position of eminence. Sometimes, in this more recent state, it has almost died out and at other times it has enjoyed flood tides of popularity, even carrying Royalty on its crest.

The outstanding details of these eras are not only interesting to students of toxophily of the present time but in any work of this kind should be brought up to date as a basis for writers of the future. I will therefore try to arrange in readable form as many of the facts, which I have picked from various sources, as seem to me to be worthy of preservation.

In the earliest times of the Anglo-Saxons and Scandinavians every evidence goes to prove that there were no legal restrictions on the use of the bow and arrow in private life. The sagas tell of numerous feats of skill that were performed in

private competition, and a few pictures, or carvings, both in Scandinavia, which at that time was closely related to England so far as such customs were concerned, and in England itself, show the householder with his weapons in his own home. Where else in fact could they be?

There were no public arsenals in those days. Every man who was subject to the universal military draft, which prevailed in those times, necessarily kept his weapons of all kinds at home and carried them with him when he was called to the service of his lord. That he should acquire skill in their use by private practice and competition is a simple and certain deduction.

When William conquered England there was a general disarmament of the population but the use of the bow was permitted again within a very short time.

That hunting with the bow in those early days was done by noblemen is proven by the fact that Sir Walter Tyrrell shot King William Rufus while chasing deer, yet in general not much is recorded of it and not much need be said. In peace times the pursuit of game was almost the only recreation of the illiterate nobility and laws against poaching were horribly severe. Some of those old statutes were in force even up to the time of at least one old man whom I knew personally and offenses were punished by mutilation, deportation and even death. A common man could hunt only illegally, as Robin Hood did, or if he had a position of special privilege such as gamekeeper.

In all periods of English history archery has not only been tolerated by the authorities but it was often given strong legal encouragement. In various reigns statutes were passed to either assure an adequate supply of equipment or to enforce its use. The following is a list of the important ones:

Edward I—

1275. Statute of Winton.



## Edward III—

- 1341. Orders to provide bows and arrows.
- 1346. Order that archery should be practiced.
- 1363. Archery to be practiced, other games made unlawful.

## Richard II —

- 1382. Sheriffs to provide bows and arrows.
- 1389. Servants to use bows and arrows.
- 1392. King's servants to practice archery.

## \* Henry IV—

- 1416. Arrow-heads to be better made.

## Henry V—

- 1416. Sheriffs of Kent and elsewhere to provide feathers.
- 1418. Sheriffs of 14 counties to provide 40,000 feathers.

## Edward IV—

- 1465. Pattens not to be made of aspe that is fit for arrows.
- 1466. Irish archery.
- 1473. Bowstaves to be imported with merchandise.
- 1474. Bows and arrows shall be made.
- 1478. Against unlawful games, bows to be used.
- 1483. Regulating price of bows.

## Richard III—

- 1483. Bowstaves to be imported with every butt of wine.

## Henry VII—

- 1488. Regulating price of longbows.
- 1504. Good bowstaves free of duty.
- 1504. Against the use of crossbows.

## Henry VIII—

- 1512. Everyone under 60 to shoot with the bow.
- 1546. Against shooting with a crossbow.
- 1546. Encouraging archery.

Mary—

1557. Repeals statute of Winton and reënacts.

Elizabeth—

1566. Relating to bowyers and fixing price of bows.  
1571. Concerning importation of bowstaves.

James I—

1603. Continues act of 1566.  
1606. To repair the shooting fields around London.

Charles I—

1628. Continues same act.  
1629. Commission to enforce archery.  
1632. To replace Finsbury Fields.  
1633. To use pike and bow together.

Charles II—

1672. Bowstaves duty fixed at 4 pounds per 120.

That bare outline may perhaps stand being filled out with a few more facts without becoming too burdensome to read.

The Statute of Winton, or Winchester, of 1275, compelled all males under a certain rank to shoot from the age of seven, obliged merchants trading with countries from which bowstaves were imported to bring into England with every ton of merchandise four, and with each tun of Malmsey or Tyre wine ten bowstaves of sound wood. Bowstaves of six feet six inches length were free of duty. Butts were ordered kept up in suitable places. This was one of the most important of all the acts and remained enforced to a greater or less extent for centuries.

The act of 1346 ordered the sheriffs of several counties to supply 500 white bows and sheaves of arrows. White bows were without paint. The next year 500 painted bows were ordered from Gloucestershire. Painted bows are quite often mentioned in the old acts, but I know of nothing to indicate whether they were colored by various pigments or whether the terms were synonymous with varnished, or oiled.

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The act of 1466 was for the Irish within the Pale. It provided that butts should be erected and everyone between sixteen and sixty should shoot on holy days from the beginning of March till the end of July. This was not so big an order as it sounds because at this time the English power in Ireland was in such straits that the Pale, or distinctly English portion, was only thirty miles long and twenty wide. At nearly this same time a law forbade all Englishmen within the Pale to wear moustaches, lest they be mistaken for Irishmen.

The act of 1363, which was reënacted in 1512, commanded everyone between seven and sixty to shoot on Sundays and holy days.

In 1483 the price of bows of yew was not to be more than 3s. 4d. This remained the standard price till the beginning of the seventeenth century.

Just how many of the British kings were archers is hard to say. Inasmuch as skill in the use of arms of all kinds has always been an important part of the education of boys of royal birth it seems probable that most of them were taught something about it. Whether they continued to shoot in manhood for the pleasure it afforded would be a matter of personal taste.

James I, of Scotland, was an archer, but I believe it was because he was brought up in England. When James was only twelve years old he was captured by some English sailors while on the way to France and was thereafter kept a prisoner in England for eighteen years. He was short, stout, well-proportioned and very strong. During the years of his adolescence he was allowed complete freedom, except that he could not go away, and history says that he particularly excelled in all manly sports, especially those which required suppleness of limb and quickness of eye. As this was during the time of the Hundred Years' War, it is only natural that archery should have been one of his studies.

In 1424, the first year of his return to Scotland, he

caused a law to be passed which was evidently inspired by the English statutes, of whose value he had had good opportunity to judge. In its quaint Scotch it is very interesting to me, and I hope will be to others:

“That all men might bush them to be Archares fra tha be 12 yeres of age, and that at ilk tenne pundis worth of land there be made bow markes, and speciallie near paroche kirks, quhair upon halie dayis men may cum and at the leist schute thryse about, and have usage of Archarie; and whasa usis not Archarie, the Laird of the Land sall raise of him a wedder; and giff the Laird raisis not the said pane, the King’s Shireff or his Ministers shall raise it to the King.”

Wedder is Scotch for wether, a kind of ram.

King James was a poet of real merit, sometimes almost as good as Chaucer, but this little quotation from a humorous poem called “Christ’s Kirk on the Green” is introduced here only because of its reference to archery:

“With that a friend of his cry’d,—‘Fy,’  
And up an arrow drew;  
He forgit it sae furiously  
The bow in flenderis flew.”

Margaret of Anjou, Queen of Henry VI, is said by Leland to have killed a buck at Alnwick Castle with a broadhead. Probably the missile was an arrow, certainly we hope it was, though possibly it might have been a bolt from a crossbow.

Henry VII was an archer, and in a poem celebrating his wedding, the fact that he took part in the contests with the bow is thus alluded to:

“Look where he shooteth at the buttes,  
And with him lords three;  
He weareth a gown of velvet black,  
And ’t is coted above the knee.”

When Francis I, of France, invited Henry VIII to visit him

at the Field of the Cloth of Gold, hoping to ally England against Charles V of Spain and the Holy Roman Empire, all three of them were young men in the prime of athletic strength. Henry was 28, Francis 26 and Charles was only 20. The political race of Europe was off to a good start. Each side at this magnificent meeting tried to put on the most impressive front. Henry had so many followers that they ate 2,200 sheep in a week. Twenty days were given over to feasts and athletic sports and archery played no small part in the English side of the exhibition. Henry shot in person, clad in the costume of a forester. The marks were 240 yards apart, but Henry was a fine athlete, over six feet tall, and, in spite of the exaggerated praise of the chroniclers, it is reasonable to believe that he shot well. Some crossbowmen of the French king's body-guard did not come so near the mark, but it would have been a courageous man indeed who would have dared to beat the visiting monarch on that occasion.

The second of his six wives, Anne Boleyn, shot too, probably with him, as in May, 1530, there is an entry in the expense account of the privy purse of 23 shillings 4 pence paid to Scawesby for "Bowys, Arrowys, shafts, brode hedds, bracer, and shooting glove for my Lady Anne." The mention of broad-heads is interesting, as it seems a reasonable inference therefrom that the Queen hunted with the bow. This was not unknown amongst English women of the gentle classes as in a letter to the Earl of Shrewsbury, in 1605, is mentioned "a verie greatte and fatte stagge, being stricken by yo right honorable Ladies handes." By the way the occasional spelling of such words as *more* and *your* as *mo* and *yo*, would seem to indicate that such a pronunciation of them, which we Americans are accustomed to hear from the members of the F. F. V.'s (First Families of Virginia), is inherited from the best circles of English society at the time of the original settlements of the Virginia plantations.

Sometimes mention is made of the payment of wagers lost

by the king while shooting with his courtiers. One of them to Lord Rocheford is forty-eight pounds, a very large sum of money in those days.

Edward VI, that gentle soul, kept a diary in his youth which is in the British Museum. It contains many allusions to archery matches in which he took part, both with and without success.

As Roger Ascham was tutor to Elizabeth in her childhood it is likely that he may have taught her to use the bow. Yet the only mention of her shooting that I can find is Hansard's statement that she shot deer with a *crossbow* while concealed in a great hollow tree called the Cadenham Oak.

In her reign a great match took place at York in which the Earls of Cumberland and Essex participated. A poem on the occasion begins:

“ God save our Queene, and keepe our peace,  
That our good shooting maie increase;  
And, praying to God, let us not cease,  
As well at Yorke as at London.

“ That all our countrie round about,  
May have archers good, to hit the clout,  
Which England should not be without,  
No more than Yorke, or London.”

Henry VII had been the first monarch to establish a life-guard, forming it of fifty tall archers. Queen Elizabeth, who liked to have handsome men about her, increased the number to one hundred. John Taylor, a plain sort of fellow who was called the “ Water Poet ” because he was a waterman by vocation, was a collector of wine duties at the Tower of London for a time and evidently he saw this body-guard in its prime. When Elizabeth died he was twenty-three years old.

In his “ Prayer of the Grey Goose Wing ” he says:



“ Within these few yeeres, I to mind doe call  
 The yeoman of the guard were archers all.  
 A hundred at a time I oft have seen,  
 With bowes and arrowes ride before the Queen.  
 Their bowes in hand, their quivers on their shoulders,  
 Was a most stately shew to the beholders.”

On my desk before me as I write is a copy of that rare little work, *The Bowman's Glory*, published in 1682, the year in which William Penn founded Philadelphia. The preface contains this sentence, which suggests that his Majesty Charles II had practiced archery:

“ But I fear that I am unmannerly, your Majesty knows better than anybody else, both the Usefulness and the Pleasure of the Bow; and we were unjust to distrust your Countenancing it.”

Certainly his public acts, or proclamations, quoted above, prove that he was very favorably disposed toward archery.

Charles II was a larger man than most people imagine. He was over six feet tall and well proportioned. When he was twenty-six years old he lived in exile at Bruges, and while there he became a member of the Guild of St. Sebastian and shot with them. He also presented to them a mace, which is still in their possession. On his return to England he witnessed, with apparent pleasure, several parades of archers but he is not known ever to have shot a bow in his own realm. From my knowledge of the psychology of archery I think he was of too treacherous a disposition to find real pleasure in that honest pastime.

After him came a line of monarchs who did not shoot, and archery suffered from a lack of royal patronage. If it be true that the love of archery lies chiefly in English blood one can see why it languished. Cromwell, to be sure, was more genuinely English than any monarch who ever sat on the British throne but his sombre Puritans would hardly countenance

what, by that time, had become no more than a game. James II apparently cared nothing for shooting.

William of Orange and the first three Georges were German speaking Germans for whom archery had no tradition, but George IV, be the reason what it may, loved the game and by his royal participation in actual shooting made archery the most fashionable pastime in England.

He was born in 1762, thus coming of age in 1783. On June 18th, 1787, he accepted the position of Patron of the Toxophilite Society, then six years old, and thus gave it the privilege of affixing "Royal" to its name. In the same manner he became Patron to the Kentish Bowmen, three years later, and they similarly enriched their title.

Within one year after the Prince of Wales, as he was then, had joined the Kentish Bowmen, their numbers had increased so much that they laid off and graded a new field and built a new clubhouse. It was for the convivial gatherings here, graced at times by the presence of the Prince, that Dodd composed his ballads of archery. Thirty years later they were gathered into a small volume, set to very good music, which can still be found occasionally in old book stalls. From a copy in my little archer's library I take such pretty verses as these:

"In Summer time with hand-bows strong,  
How gay the roving down the glade;  
What sport while yet the leaves are long  
At butts beneath the green-wood shade."

"A Bowman's life's the life to court,  
There's nought can charm so dearly  
As roving, butting, all in sport,  
To the sound of the bugle cheerly.  
When morning smiles on hill and dale,  
Away he wends,  
His bow he bends:  
His shafts will seldom fail;  
Full thirteen score,

And something more,  
To steadily hold their flight:  
Anon at the butt  
With a delicate cut,  
He pops them in the white."

The Prince occasionally shot with the other archers at both of these societies and to both of them presented prizes. The Royal Kentish Bowmen vanished from off the face of the earth in 1802, but the Royal Toxophilite Society has continued to the present time, as we shall see more fully later, and by an act of his in that society Prince George profoundly influenced the whole subsequent course of archery.

In 1792, and for ten years afterward, he presented a prize of a silver bugle, to be shot for according to regulations prescribed by himself. Before that the usual distances were sixteen, twelve, eight and four roods, which, interpreted into our more comprehensible unit of the yard, would be: 120, 90, 60 and 30 yards. The stipulation of the Prince was 100, 80 and 60. It is for this reason that these distances are still called The Prince's Lengths. The count of the target rings he fixed at nine, seven, five, three and one, and these received the name of The Prince's Reckoning. An end of arrows had until then been two at each target, but the Prince changed this to three at each target. One might expect this arrangement to be called The Prince's Ends, but if it ever were I can find no mention thereof.

These innovations, for taken as a whole, they may be considered as such, met with popular favor and ever since then have been in use all over the English speaking world except in Scotland and with the Woodmen of Arden. Regarding the number of arrows to be shot and the size of the targets so much cannot be said. Instead of using only one four-foot target for all distances, as we do, they used that size only at 100 yards, while at 80 the diameter was three feet, and at 60 it was two. There can be little doubt but that this change

of size had its origin in the days when the face was not marked in rings and the whole thing was a sort of bull's-eye, indicating the circumference within which a very good archer should set his arrows at the respective distances.

King William IV was not an archer, but he also consented to act as Patron to the Royal Toxophilites. The exact date of his acceptance I cannot find, as during that time the records are very scanty, but as he began to reign in 1830 and a silver cup which he gave as a prize was first shot for on June 20th, 1834, it must have been in those years and most likely just before the donation of the trophy.

Queen Victoria ascended the throne three years later, a beautiful young girl of eighteen. When she was a child of fifteen her mother, the Duchess of Kent, must have taken her to the seashore near Hastings in the summer, for in that year both she and the Duchess became patronesses of the St. Leonard's Archers of that place, which enabled them to join with the Kentish Bowmen and Toxophilites in calling themselves Royal. Their Royal Highnesses also presented several perpetual prizes to be competed for annually. On Her Majesty's accession she continued her interest and desired that the society should be known henceforth as the Queen's St. Leonard's Archers. In 1840, the year of their marriage, the Prince Consort ordered his name to be inserted as a Patron in conjunction with that of Her Majesty. There is something peculiarly charming about this, something so natural and ringing so true. The kindly little princess on her holidays loving the graceful outdoor game, giving her affectionate interest to it and later on, amid the cares of a vast empire, looking back to the happy days with tender remembrances which she shared with her husband. It is curious that she should have taken up the bow on the very spot where her predecessors conquered and were conquered by it.

Queen Victoria was also Patroness to the Royal British Bowmen of Flintshire, a county that would send most Ameri-



*THE MARCH OF ARCHERY.*

PUBLISHED AT LONDON IN 1829, SHOWING ARCHERS' MARKS IN THE GOLD





cans to their maps to locate. It is in the northeast corner of Wales, bordering the broad estuary of the sea which is called the River Dee. For years Her Majesty gave fifty pounds a year to be divided into two equal cash prizes for the ladies and gentlemen.

In 1844, the Queen became a member of the Guild of St. Sebastian at Bruges, the society to which Charles II belonged, and in 1893 presented a prize to them on completing the fiftieth year of her membership.

The Royal Toxophilite Society sought to have the Queen become their Patroness but she would not do it. The Prince Consort, however, granted the favor, and after his death Albert Edward, Prince of Wales, who afterward became Edward VII, consented to fill the position, as has his son, King George.

Since the days of Queen Victoria's girlhood no member of the British royal family, so far as I know, has been an archer.

Excepting the queens, Victoria and Margaret, I know of no other royal lady who shot in the bow except Mary, Queen of Scots. *Badminton* says that she was very fond of it, that she had butts in her gardens both at Holyrood and Saint Andrews, and that in one of the inventories of her effects mention is made of a velvet glove which she used when shooting. After the murder of Darnley, in 1567, she and Bothwell won a dinner from the Earl of Huntly and Lord Seton in a match at Seton Castle.

Archery is often alluded to by its partizans as the Sport of Kings. Perhaps from this list, where the facts are marshalled in order, it might appear to be so and yet the soubriquet seems to me to be born more of the wish than the fact. What if a few kings and three queens did occasionally shoot a few arrows? Did they not also enjoy riding, hunting, horse-racing, tennis, hawking, yachting and nearly all other sports that were prompted by the customs of their times? We archers may think our hobby the King of Sports, but we must at least con-

cede that if we call it the Sport of Kings we must share the title with many others.

While archery was often greatly assisted by the interest of the king or queen, as all things which have a prominent social side are bound to be, it was too essentially in its origin a function of the people to be entirely dependent on Royalty for its existence.

When Roger Ascham wrote, in 1545, he said, "That no man hitherto hath written anye booke of shootinge, the faulte is not to be layed in the thinge which was worthy to be written upon, but of men which were negligente in doinge it, and this was the cause thereof as I suppose. Menne that used shootinge most and knewe it best, were not learned: men that were learned used little shootinge, and were ignoraunt in the nature of the thinge, and so fewe men have bene that hitherto were able to write upon it."

Those lines describe archery as we know from history it really was, occasionally indulged in by a person of rank but against a few such were hundreds, or even thousands, of the plain men who composed the mass of the populace.

The most ancient societies indicate by the nature of their shooting that they originated in games of the people. For example, as they were not permitted to shoot at real birds, except within strict limitations, they set up an effigy called a popinjay, or in Scotland a papingo. What is, or was, undoubtedly the oldest archery meeting in Great Britain is the annual Papingo Shooting at Kilwinning, a little town in Scotland about three or four miles from the Firth of Clyde. My uncertainty as to whether to use the present or past tense in describing it is due to the fact that I am afraid, but not certain, that it has not been resumed since the Great War.

According to good tradition, which was credited by the Lyon King of Arms, it dated from 1482, near the end of the Wars of the Roses, the next to last year of the reign of Edward IV. This is getting pretty far back, for a society which

still exists. It is ten years before Columbus sailed the ocean blue.

Kilwinning is the traditional birthplace of Scottish freemasonry, the lodge there, which is regarded as the mother lodge in Scotland, having been founded by foreign architects and masons who came about 1140 to build a Benedictine Abbey. This abbey was once among the finest in Scotland, but it was partly destroyed in 1561. However, the northwest tower, which is 105 feet high, still remains and it is to the top of this that the small wooden papingo is affixed, stuck on a spike in the end of a projecting beam. The shooting was for a specified time and each archer was obliged to touch the base of the tower with one foot while having his turn.

There was a charming old-world fascination in this annual event which brought archers from far away, a pleasing savor of antiquity. The chief prize was a benn, or sash of pink silk with a gold stripe, and after the match was over the archers paraded through the town and stopped at the door of each ale-house for a drink. It was deservedly popular.

The first royal patent which established a definite archery society, for purposes of sport in part and not only as a company of soldiers, was that issued in 1538 by Henry VIII. It is given in its full text, printed in the mediæval black-letter type which was still used in records of law, in *The Bowman's Glory*. After personally naming six gentlemen, it gives them power "to gadre, knytte and establyshe a certeyn perpetuall Fraternytye of Saynt George," to "be Ouerseers of the Scyence of Arttyllary, that ys, to wyt, for Long-bowes, Cros-bowes and Hand-gonnes" and "for theyr dysporte and pas-tyme to exercise shotyng at Almaner Markys and Buttys and at the Game of the Popymaye."

A provision which interests us because of its proof of the antiquity of a word which is still in common use, says that "when any shall openly speke thys usuall worde Faste, then yf yt happen any parson passyng betweene any suche shoter

and the Marke be kyllled or hurt, then any such Mayster, Ruler and Brother shall not be arrested, ymprysoned or otherwyse ynonnytted."

Most writers have believed that this was the original patent of the Honourable Artillery Company, but some, with whom I agree, think it was exactly what it says, the foundation of a society of archers and small-arms men called the Fraternity of St. George.

At that time London was still such a small city that open fields encompassed it hardly a mile back from the Thames, places which are now in the heart of the metropolis. A small book called *Aime for the Archers in St. Georges Fields*, which was entered at Stationers Hall in 1664, carries in that title the name of one such locality and I suspect that the purpose of the royal act of 126 years before had been to "gadre and knytte" the archers who shot there into a manageable association which might be available for the defense of the realm. Whether it were still a corporate body at the date of the publication of the *aim*, I do not know.

When the H. A. C. was formed, forty-seven years later than the Fraternity, its members shot at Spital Fields where they were sure to come into contact with archers, as all the shooting fields were near each other, and their act of forming an Archers Division was quite a natural one. While individuals might have belonged to both that division and to the Fraternity of St. George, the fact that the two organizations are mentioned separately in several places makes it seem unlikely that they were ever amalgamated.

It was only natural that the wish to be up to date should incline the young men of that progressive Elizabethan period to choose the new firearms over the ancient bow. Captain John Smythe said that those who clung to the really superior weapon of their forefathers were twitted with the title of "King Harry Captains," as belonging in spirit to Henry VIII of three reigns back.

The Finsbury Fields were the largest and most important and were kept open to archers by law for the longest time. Though no patent is known, as for St. George's, the Finsbury Archers had some sort of organization, however loose, and I have before me a list of the Captains and Lieutenants, or winners and runners-up, in their annual target meetings from 1658 to 1757. The number of contestants was very small, varying from 43 in 1684 to Alexander Bryers, by himself, in 1726. The average in the seventeenth century was 26, in the eighteenth 13. The last Captain, in 1759, was Philip Constable who carried their traditions and property over into the Toxophilite Society twenty years later.

The prizes shot for in both England and Scotland seem to have been most often a silver arrow for the Captain's Prize, or championship, which remained the property of the society of archers, and silver spoons, or other pieces of plate, which were purchased with the entrance fees and given outright to those who won them. A varying number of spoons, "according to the moneys deposited" were assigned to each of the rings of the target, which at first had no numerical values, and a spoon belonging to a ring was awarded for a hit within it until "the targets were shotten down," that is, until all were gone.

The oldest extant silver arrow is that of the town of Musselburgh, a suburb of Edinburgh, which bears an attached medal dated 1603. It is a foot long and was originally silver gilt, though now it is worn down to the plain silver. With several others it is the property of the Royal Company of Archers.

In England the oldest and, I think, the only one is the Antient Scorton Arrow, which has been shot for annually since May 14th, 1673, when 22 men competed at Scorton, until the present day, except in 1788 and 1789 "for want of a sufficient number of archers" and from 1914 to 1924. Like the Musselburgh Arrow this little trophy, which is small



enough to be worn as an ornament on a cap, was once probably silver gilt, as in the oldest records it is called "the golden arrow."

In contrast with the valuable spoons of silver, others of wood or horn were given in a spirit of fun to the least fortunate archers. It was to perpetuate that custom that I carved the oaken spoon which is awarded to the lowest man, in our annual American tournament, who has shot through the York and American rounds. Accompanying the Scorton Arrow there is a horn spoon of apparently equal antiquity which goes to the archer who makes the worst hit in the white in the last end, or in the last end having a white.

The earliest targets were doubtless of plain surface and varying size but by 1673 they were divided into four rings, gold, red, blue and black, surrounded by a white petticoat of indefinite width which was called the sous, because a hit within it paid a sou, or farthing. In later years this was standardized in size to form the white ring, thus completing the modern target of five rings which has a petticoat of no value. In some targets the blue was left white, thus making an inner white and outer white.

Much of what I say about these details is gathered from a unique source. By a generous gift of Capel G. P. Pownall, Esq., who was captain, or champion, of the Scorton Arrow meeting of 1905, I own a bound typewritten copy of its record of captains and lieutenants from 1673 to 1906 and of its minutes of the first meeting and then of the meetings from 1767, when a new book was started, to 1906. The book from which it was taken was deposited recently in the museum of Hull and a third book has been begun.

As with the Finsbury Archers, the number of contestants for the Scorton Arrow was always surprisingly small, the most being 30 in 1845. Such figures make it very hard for the student of archery to estimate the true number of archers in England at any given time.



The *Gentleman's Magazine* for 1832 prints in full the "Articles agreed on by the Society of Archers for the well ordering of their game yearly to be shott at in Finsbury Fields, and more especially for the present yeare 1687." As they agree in all essentials with those of the Scorton Archers we may reconstruct the accepted practice of that period, parts of which persist in modern archery.

With opposed targets placed at great distances, for example eleven score at Finsbury and eight score at Scorton, one or two archers shot at a time, led off by the captain and lieutenant. After the manner which is still used on the continent, each man shot one arrow and then filed to the left. When all had shot, the queue went about for a second time, the end thus consisting of a pair of, or two, arrows. In 1792 and some other years near it, the Scorton records specify a gold of four inches. Since such small targets must have been very hard to hit and the shooting would be prolonged beyond reason, it was ordered that after every three "rounds," or double ends, they should be moved ten yards nearer to each other, provided they never were closer than sixty yards, until shotten down. The man who first hit the gold was named captain for the ensuing year and the first to hit the red, lieutenant. It thus happened sometimes, though not often, that the same man held both offices and pocketed the monetary prizes that usually went with them.

In 1676 the treasurer of the Finsbury Archers was William Wood, who published *The Bowman's Glory*. He was evidently a hustler, of the type without which no archery society seems able to thrive. In the same year he went about among the archers with a subscription list for donations of a guinea apiece to buy a badge for him, as he had been elected "Marshall to the Queen's Majesty's Regiment of Archers." The petition was authorized by the "Officers and others of the Society of Archers within the cities of London and Westminster," so it would indicate still further that the combina-

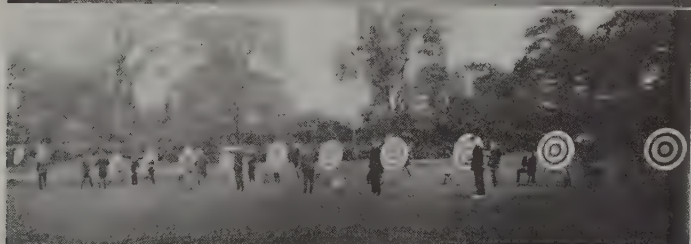
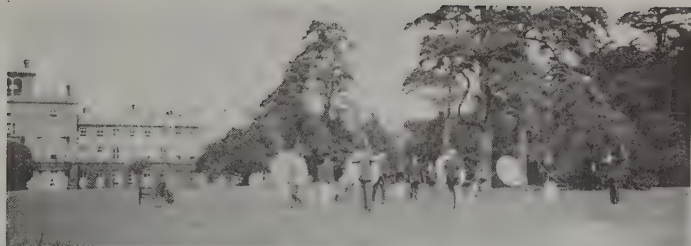
tions of bowmen were rather loosely formed and more or less interlocking.

The badge is now in the possession of the Royal Toxophilite Society. It is a large emblem, big enough to nearly cover the chest, showing two bearded men in tight-fitting garments that look like modern one-piece bathing suits, supporting a central oval on which is an archer with full drawn bow, dressed in short trousers gathered above the knees. The inscription on it is, "*Reginæ Catharinæ Sagittarii*," which means the archers of Queen Catherine. Queen Catherine of Braganza was the wife of Charles II and it is sometimes stated in books that she presented this shield, which is not so.

Wood died in 1691 and the shield was kept in turn by succeeding marshalls until it reached the last one, Mr. P. Constable. When the Toxophilite Society was formed he joined it as a friend of one of the founders, Mr. Waring, with whom he sometimes shot, and thus brought the shield and some records of the Finsbury Archers into the permanent keeping of that society.

There was a most extraordinary pageant of archers held in London on the 17th of September, 1583, which has been spoken of in so many books and which in itself was so different from anything else that I have come across in the history of archery that I am tempted to write of it fairly fully. It is called "A Remembrance of the Worthy Show and Shooting by the Duke of Shoreditch and his Associates, the Worshipful Citizens of London."

As a preamble it is stated that one day Henry VIII was at Mile-end when Prince Arthur and his Knights were there shooting and that he did commend the game. This does not refer to Prince Arthur his elder brother, who died in 1502, seven years before Henry VIII ascended the throne, but to a group of archers who are known to have existed then and who, in the spirit of sport, named themselves after Arthur of the Round Table and his Knights.



## ENGLISH ARCHERY

On an English lawn

The Scorton Arrow, 1912

The gentlemens targets at a typical meeting

Some gentlemen at the Grand National, 1922



Quoting verbatim, "This noble King at another time keeping a Princely Court at Windsor, caused sundry matches to be made concerning shooting in the Longbow: and to which came many principal Archers, who being in Game and the upshoot given, as all men thought, there was one *Barlo* yet remaining to shoot, being one of the King's Guard; to whom the King very graciously said, Win them all and thou shalt be Duke over all Archers. This *Barlo* drew his Bow, and shooting won the best. Whereat the King greatly rejoiced, commending him for his good Archery; and for that this *Barlo* did dwell in Shoreditch, the King named him Duke of Shoreditch. (A sign of a Princely mind to the encouragement of his poor subject.)"

This pseudo-title was evidently handed down, no doubt as a sign of exceptional proficiency, a sort of championship as it were, and in time it became a custom to surround him with a kind of mock court. Thus in 1583, "at the great cost of sundry chief citizens," "The worthy Shoreditch Duke, as Successor to the former Dukes, his Predecessors, gave warning to all his Marquesses, Earls and Barons, with all their train of Archers whatsoever, in and about the City of London, to be in readiness to accompany him into the Field, every one with a long-bowe and four Shafts."

From the long and involved description of the parade I make out that there were at least fifty-two sections. Among them, for example, were Multitudes of good Archers with green Ribbons and Scarves, certain Knights of great worship, Swattrutters of stern countenance, a Troop of Barons in Chains of Gold with Pages in green Jackets, a Consort of broken Musick playing to the delight of all hearers and, last of all, an hundred Shot, very ready and nimble to discharge.

Every section was beautiful and elaborate and I think the whole has a deep significance. Does it not show why the land of our forefathers was called "Merrie England," and what

other evidence could we find that would prove so conclusively the hold that archery had on the hearts of the people?

The whole number of marchers was about forty-one hundred and when they reached the shooting fields three thousand men shot at a new butt set up at one hundred and forty-eight yards. At the end of the match, on the next day, five young men had come to a tie and were carried home in state by hundreds of their neighbors.

From time to time a costly stake or roving mark of the sort described on page 393 was provided for the shooting fields by some wealthy citizen of London, no doubt as a means of courting popularity. An elaborate procession of archers would escort it to its site and much merrymaking and feasting at the donor's expense would occur at its final emplacement. A contest in archery always ended such a field-day, though the shooting seems to have been at a butt rather than at the new stake.

Let us now take an accounting for a definite date, say the beginning of the eighteenth century, to see what was the condition of archery at that period and thus set the stage for newer scenes.

Of England, we know but little except that the Finsbury and Scorton archers held their yearly meetings and a modest number of bowmen shot at butts and over the roving fields. Of military bodies there were none who had not discarded the bow for firearms.

In Scotland, the Royal Company of Archers flourished in strength and the papingo was shot for at Kilwinning and possibly also at the neighboring town of Irvine. At Musselburgh and Peebles there were annual matches for silver arrows and at St. Andrews University the colleges of St. Salvador and St. Leonard competed each year.

In Wales and Ireland there was probably little or no shooting.

This is all I can say of organized archery. Undoubtedly



there were a great many archers scattered over Britain from one end to the other who were of the kind described by Ascham as being better at shooting than at writing about it, but there is no way of judging their number nor their influ-



Half of a Finsbury Archer's Ticket.—*Gentleman's Mag.*

ence in keeping alive the sport. One thing we do know is that enough bows were sold to keep a few bowyers and fletchers in existence; for example we know definitely that the Kelsals, of Manchester, had followed these trades for several centuries and continued to do so for about a century after the time of which we are speaking.

On the whole, however, the decline of archery from this date was precipitous. Not only were no new contests inau-

gured nor societies formed but, what seems to me to be most significant of all, the thousands of bows which must have been in England disappeared from the face of the earth. As I have said before it is an astounding fact that of all those myriads of bows and bowstaves that were either brought into England, or manufactured there, for century after century, only two have remained above ground.

It must have been during the first three-quarters of the eighteenth century that this universal vandalism was perpetrated for in the last quarter, when archery was revived, the new Toxophilites found that the old weapons had vanished. Some government records mention bundles of rotten bowstaves, some are known to have been used to kindle fires, and I suppose the rest were used for any purpose that would require a straight stick. Somehow it is less painful to me to think of a sword being beaten into a ploughshare than of a yew bow serving as a bean-pole.

Julius Cæsar attributed the manly qualities of the Belgians to the facts that "merchants least often resorted to them and they were farthest removed from those things which tend to effeminate the mind." Perhaps it was for similar reasons that archery seemed to keep a firmer foothold in the north of England than in the south, or you may say that the Scandinavian blood was thicker there or ascribe what cause you will. Yet it is true that there were enough interested archers in Richmond, Yorkshire, near the scene of the Scorton arrow contests, which by the way have been held only three or four times at Scorton itself, to form a society, called the Richmond Archers, on May 13th, 1755. Probably it was a rebirth of an older gathering, as so many clubs have been, as in 1782 it is spoken of as an ancient society, which would hardly be justified by twenty-seven years of existence. The next year the Scorton contest was held in Richmond, though it had often been there before, and twelve men shot in it.

Real modern archery may be said to begin with Sir Ashton

Lever. I believe that no archery society has ever been known to thrive unless some enthusiast were there to foster it and Sir Ashton was a man of exactly that temperament. He was essentially a faddist. First he had a wonderful aviary of birds, one of the best in the world, then he suddenly tired of that, got rid of it in a hurry, and collected enormous quantities of seashells, fossils, stuffed animals and similar objects and formed a museum which was known throughout the country. Up to this time he had lived near Manchester but when his collection became so famous he took it to London and set it up for public inspection in Leicester House. He had brought with him as curator a Thomas Waring, who had worked under one of the Kelsals. Waring contracted some pulmonary trouble in the dusty museum, just as poor old Ishi did at the museum of the University of California in our own land and time, and he took to shooting in the gardens of Leicester House to cure himself. This was in our year of Independence, 1776. His recovery was so rapid and complete that Sir Ashton became interested in the bow with all the enthusiastic energy that he gave toward any new hobby.

To make a success of any social organization in England, at least in those days, nothing counted more than rank, and therefore to have archery taken up again by one of the lesser nobility, after it had been in the hands of common people for so long, brought it into immediate prominence. Shortly after he began to shoot, in 1777, he gathered together a band of the neighboring gentry in the vicinity of his home near Middleton, a suburb of Manchester, and organized the Middleton Archers, a modern club such as we are accustomed to at the present time.

At London he did the same thing, gathering such friends as cared to shoot, together with P. Constable and any other Finsbury Archers who still existed, and forming them into the Toxophilite Society.

From that day to this the Tox. has been the most influential

society of England, rivalled only by the R. C. A. of Scotland. In 1784 the museum was disposed of by lottery and the Toxophilites were obliged to seek a new range. On May 26th of that year they therefore sent a letter, signed by twenty-four men, headed by the Earl of Effingham, to the Honourable Artillery Company requesting leave to shoot in the Artillery Ground.

Negotiations were satisfactorily concluded with the result that for the first time since the very earliest days of the H. A. C. it once more possessed an Archers' Division. Indeed there are those who say that this was the first and only Archers' Division that the H. A. C. ever had and assert that the original one was a myth. I do not agree with this for if so why would the H. A. C. have the right to tear down obstructions in the Finsbury Fields, specifically to assist the fortunes of Archery? The Archers' Division accompanied the H. A. C. in the last of these peregrinations and one of the archers stood on a wall and shot an arrow from that perch to prove their rights and show that they could have torn the wall down if they had not been so tender hearted. This affiliation lasted for twenty years and was then discontinued.

When Prince George became Patron the society boomed. Its members increased to one hundred and sixty-eight and they rented and levelled a range of their own. Other societies began to form in different parts of the kingdom in imitation of it.

The first general meeting of these clubs, in what we now call a tournament, was on May 17th, 1789, at Blackheath, an open common five miles southeast of St. Paul's Cathedral, London. In fact five meetings in successive years were held there. In 1791 thirteen societies were represented. Of these the Honourable Artillery Company were present in sufficient numbers to be grouped in two divisions and so were the Toxophilites. That would look to me as though the two societies were both very flourishing and the Archers' Division of the

H. A. C. were perhaps not so dependent on the Tox. as has been supposed. In 1792 there were ten societies and in 1793 nine, from which I judge that 1791 was the peak of the popularity of archery in that period.

It was an age of hard drinking, as all readers know. Every man was expected to get as drunk as he chose; apparently the more soaked he became the more admiration he received. It was the time when gentlemen were rated as two-bottle men or three-bottle men according to their powers of resistance to alcoholic intoxication. There were celebrated wits whose genius would not sparkle at its brightest until they were paralyzed from the hips down. It is therefore not to be wondered at that more attention was paid to the preparations for conviviality at the fashionable archery gatherings, when the banquets were even graced by the presence of the high living Prince of Wales, than to the shooting. To be sure they did shoot from twelve to three and from half-past three to six. I imagine it took many of them till noon to get freshened up after the night before.

There is no way of telling much about the shooting. The size of the targets is uncertain, though it was sometimes surely four feet, the number of arrows varied greatly and prizes were won, as children naturally play to-day, by an occasional hit in the gold even though most of the other arrows might miss the target.

They certainly must have had a good time, though. Each company had its marquee where there were refreshments to sustain life during the intermissions between the more formal feasting, bands were present which played stirring marches when the archers advanced to the other line of targets at each end, and according to Roberts there were "tens of thousands" of spectators.

A Mr. Anderson, who won the meetings in 1792 and 1795, was a Fleming and shot with a Flemish bow. So far as I



know he was the only foreigner except our own Richardson who was ever victorious in England.

In 1794 and 1795 general meetings were held at Dulwich but I have no details of them except the names of the winners.

Two years before, in 1793, war had been declared on England by France, which was in the horrors of the French Revolution. The times immediately became exceedingly restless, not only from military manœuvres but because the tremendous convulsions in the life of the French could not fail to spread more or less into all other countries. In this book of archery perhaps it should be recorded that a conspiracy was discovered, or at least suspected, whose object was to murder King George by means of a poisoned arrow. Maybe we might try to find a little excuse for the plotters if it were not that they intended to shoot it from an air-gun.

In national crises like these, archery has to go just as surely as it did in the World War. The French Revolution ran into the Napoleonic Wars and it was not till well after Waterloo, in 1815, that English life could begin to quiet down sufficiently for the people to pay attention once more to sport.

As in the previous century the first move was seen in Richmond, near the Scorton Arrow, so now the first sign of renewed interest was the formation of the Irvine Archers, about four miles from the Kilwinning Papingo. I suppose that one of the reasons why the Arrow and Papingo have persisted through every time of stress is that the matches are so easy. Anyone might take a day off to shoot at a wooden parrot or to lose a few shillings to his friends who could not spare the time to go through the arduous practice necessary for making a decent showing at a great formal match.

The convivial Prince of Wales became George IV in 1820 and in that same year enough archers were in existence for some one of them to make an unsuccessful proposal for a general meeting. The next year a circular to similar effect was sent round but nothing came of it. Then one by one new



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societies began to form, the Thirsk Bowmen, in Yorkshire, in 1824, New College, at Oxford University, in 1825, the South Saxon Archers, of Sussex, in 1827, and so on until about 1830 enthusiasm burst out again, as it seems to do periodically, and societies were formed all over the kingdom in the succeeding five years. In the meantime some of the old societies had become revitalized. The Royal British Bowmen started shooting again in 1818, and John o'Gaunt's Bowmen, of Lancaster, followed in 1820. The Royal Toxophilites and the Woodmen of Arden had never wholly stopped shooting, although in the case of the former it was probably kept alive by a very few members as the records are either wholly lacking or in an incomplete state.

From 1835 to 1844 archery grew stronger and stronger until in the latter year it was decided to once more establish an open contest for all the clubs of England.

This so-called Grand National Meeting was held on the race course known as the Knavesmire, at York, on August 1st, 1844. At once the question of standardization arose, as neither the targets nor the methods of scoring were uniform among all of the clubs. For example, I have before me three different books of instruction, published during the '30's, in which the ring values are given as 9, 3, 2, 5 for 4, 1. In the black ring an extra point was added at every fourth hit. It was agreed that the Prince's Lengths and Prince's Reckonings should be used and that the number of arrows at each distance should be such as would give approximately equal scores, which, in the judgment of the committee, was six dozen at one hundred, four dozen at eighty and two dozen at sixty. The winner was chosen on the basis of highest gross score, and his prize was a vase worth fifty-five pounds.

This is the tournament that gave the York Round its name and made it the standard round for every national tournament in England and America from that time to this. The Rev. J.

Higginson won it with a Single York of 53-221. No ladies competed.

Since this first meeting the tournament has been held every year except during the World War. I will try to pick out from the records some of the interesting facts but I see no use in detailing every match.

In 1849 the National Round for ladies was invented and shot for the first time, consisting, as it does now, of four dozen at sixty yards and two dozen at fifty.

It was at this meeting, at Derby, in 1849, that the abominable system of "points" was invented. I lay special stress on this fact because many archers who have not given serious study to the matter are under the impression that the point system is of great antiquity. This is distinctly a mistake as before then winners had always been chosen either by score alone, as in previous Grand National Meetings, by first hits in the gold, as in many other meetings, or by various other figurings of hits and score but never by points.

In the point system the archer is not credited with the score he really makes, nor with the exact number of hits, but his standing is based entirely on comparison between his own marks and those of the other archers. A man may get just as many points if he win with a miserable score over a company of what Ford calls "muffs," as though he obtained a victory over the best in the world. It is worked in this way:

- 2 points for highest gross score.
- 2 points for most hits.
- 1 point for highest score at each distance.
- 1 point for most hits at each distance.

Thus it will be seen at once that there are ten points given in the York Round and eight in the National.

Even in this first match the essential unfairness of the system was manifested. Capt. A. Penistone Moore made a score of 173-747 and Horace A. Ford made 176-702. All

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of us English speaking archers who, in both countries, have at last been emancipated from that plague-ridden system, must feel that Moore was the real winner, even though the victory were technically handed to Ford. I have not at hand all the details of this score but we can see that Moore got two points for gross score and Ford two for gross hits. Of the other six Ford got three but Moore only got two because a man named Attwood, who did not figure in the real result at all, snatched one point. In these cases it is most often a man who performs the comparatively easy feat of getting twenty-four hits at sixty, when a leading archer has dropped one arrow, who deprives the real winner of the just fruits of his toil.

Here is a list of those whose really superior scores have failed, because of "points," to give them the championship:

<i>Year</i>	<i>Name</i>	<i>Score</i>	<i>So-called Winner</i>	<i>Score</i>
1849	A. P. Moore.....	173-747	H. A. Ford.....	176-702
1879	Mr. Rimington.....	165-799	R. Walters.....	187-729
1880	Mrs. Piers Legh.....	124-600	Mrs. Horniblow....	133-593
1884	Major C. H. Fisher.....	191-941	C. E. Nesham.....	208-902
1889	Rev. C. J. Perry Keene...	177-859	Mr. Gregson.....	198-832
1893	Rev. C. J. Perry Keene...	169-719	Mr. Gregson.....	172-656
1896	Miss B. M. Legh.....	115-587	Miss B. Oakeley....	123-559
1903	G. Sharpe.....	177-769	R. Brooks-King.....	189-767
1926	H. A. Cox.....	177-783	R. Brooks-King.....	184-762

In 1893 Mr. Gregson was tenth in score and yet he won the championship on points!

In 1869, 1870 and 1871 the championship was awarded for the highest score but in 1872 they returned to the point system. Essentially the point system finds its adherents in those who know they cannot win but who hope, by good luck, to get either a point or a fraction of one. It is a question that for this reason can bring out many adherent votes at a meeting.

The lowest tally of which I have any knowledge was made at the first meeting by G. Robinson, who got nothing at all at 100 and 80 and 2 hits 8 score at 60.

In 1848 one of the greatest archers who ever drew a bow made his first public appearance. Horace Alford Ford is a

figure of such overwhelming importance in the history of archery that I will speak about him now, at length.

Born in 1823, the son of a solicitor and owner of a colliery, in which latter business he was associated, he was six feet two inches tall and of slender but commanding appearance. He was a good cricketer, an expert player of chess and billiards and a pleasing performer on the piano, violin and, more especially, the cello. Versatile and charming, a quiet, refined gentleman.

His initiation into archery was under Mr. Edward Maitland, an excellent shot, in 1845 at Queen's Park, Brighton. With immediate enthusiasm he took to the sport, even getting up at four in the morning to practice, but what were his scores in those years of preparation I do not know. At any rate, the *Archers' Register* for 1881, in a memorial of his death, gives his first double York round in a Grand National Meeting, that of 1848, as 76-288, a figure which provides perennial consolation for beginners.

Ford was a pioneer in the development of technique and after years of study he elaborated the system that is now in such general use that all others are forgotten. To draw under the eye, to the neck rather than to the ear as was formerly done, to sight along the arrow and to use a point of aim were its main features; everything being executed with meticulous exactness.

From 1849 to 1859 he won the York round, or championship, eleven times in succession and in 1867 he won it again, his average for the twelve victories being 205-947. Four of them were over 1000, a mark which no other archer has reached in the Grand National except C. E. Nesham in 1886. In 1857, at Cheltenham, he made the score of 245-1251 which was the despair of champions for seventy-one years until in 1928 at Santa Monica, California, it was surpassed by the 255-1309 of C. W. Douglas. For two way shooting, at double targets, it still remains the world's record.

In 1860 he went to pieces, getting third place with 807, and the next year was fourth with only 661. In '62 and '63 he was second with 896 and 780 but in '64, after an excellent start of 182 for the 100 yards, the flexor muscles of his drawing arm, especially those controlling the first finger, gave out and he had to leave the field. Those who knew him said that his general health was failing. In '65 he did not compete and in '66 he was eighth man with 666. The last flare of old time form was in 1867 when, with two absolutely still days, using a weak bow and reinforcing his first finger by placing the second over it, he rose to 1037 and took his final championship. After fifth and fourth places in '68 and '69 he left archery forever.

We may now add an item which, before 1932, never appeared in print. By a fortunate purchase in the spring of this year, Mr. Philip Rounseville obtained a copy of the second edition of Ford's book which was copiously annotated by Mr. Longman, one of the future editors of *Badminton*, evidently in preparation for such a work. In it is this pencilled note:

"The second edition of this book was out of print long before the author's death on June 24th, 1880, but, owing to the peculiar religious opinions he adopted toward the latter end of his life, he would have considered it an additional wickedness to reprint this work, which, itself, he looked upon as his worst crime. He was one of the Plymouth Brotherhood."

The *Archers' Register* says that Ford's specie prizes in the great open meetings from 1848 to 1869 amounted to six hundred and nineteen pounds.

Until 1931, when G. Wayne Thompson, of Sunnyvale, California, made 139-825, Ford was the only archer who crossed 800 in the single York round. The proof of his great practice scores is contained in a personal letter to Major Fisher and in a paragraph from his own book. As many of my

readers may never have access to the older literature which contains them I will quote both in full:

*"Cheltenham, Wednesday.*

"Dear Fisher,—I'm vexed you could not come this morning, as it was beautiful for shooting, and because also I should have given you 'an eternal hiding' at golds and reds. I shot the 144 arrows, and made in these colours 548—that's all—getting altogether at 100 yards 69–371; at 80 yards 48–274; at 60 yards 24–154, 141–799. Mettez cela dans votre pipe and smokey le. Come on Tuesday next, if fine. I know nothing to prevent my shooting on that day.—Ever thine, H. A. Ford."

"Under the risk of being considered egotistical, but to oblige the requests of several correspondents, I now give the three following specimens of my private practice—I need hardly say my best. The first two are the Single York Round of six dozen, four dozen, and two dozen. At the first I made (with an Italian self-yew bow of Mr. Buchanan's and 5s. arrows of Mr. Muir's) 71 hits 335 score (missing the '59' shot), 48 hits 272 score, 24 hits 158 score, giving a total of 144 shots—143 hits, 765 score. At the second (with a yew-backed-yew bow and same arrows), 66 hits 344 score, 47 hits 301 score, 24 hits 164 score; total 144 shots—137 hits 809 score."

The third score which he quotes in this passage is not the York round mentioned in the letter to Fisher, which seems to have slipped his memory, but is a St. Leonard's round of seventy-five arrows at sixty yards. The total was 75–555, made up of twenty-eight golds, thirty-seven reds, seven blues and three blacks.

In November, 1851, Ford shot a double York round in a friendly tilt with the Rev. John Bramhall and Capt. A. Penistone Moore. The three fine scores were Ford 262–1414, Bramhall 250–1244, Moore 223–1045. At the one hundred yards' range in this double round Ford got 127–617, Bramhall 114–504, Moore 100–440.



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If it were not that they are placed in comparison with Ford's superlative scores Bramhall's would be considered wonderful. In another private match these two gentlemen shot the following single York:

Ford 63-319; 46-272; 24-154:: 133-745.  
Bramhall 57-243; 46-236; 24-149:: 126-626.

Captain Moore, in the *Archers' Register* for 1881, speaks of a remarkable end at one hundred yards made by Ford, Bramhall and himself. Of the nine arrows six were golds and three were reds, Ford had three golds, Bramhall two golds and a red and Moore one gold and two reds. Once when Ford was shooting with Fisher he put in two golds at one hundred yards and then turned to Fisher and offered to bet that he would make a third one. Fisher offered him twenty shillings to one. Ford shot, made it and pocketed the sovereign, thus, as Fisher says, making four golds with three arrows. At another time he did the same thing with Moore except that the bet was five shillings against the pound. Ford also made three golds at one end at 100 yards at the Grand National of 1854, a feat repeated only once, by Colonel Burton in 1891.

No other Briton has reached 700 in the single York round and for more than half a century none has made 600. In the records of the Royal Tox. I find that in 1858 H. C. Mules had a testified score of 115-603. On the Target Days of that society, August 2nd, 1872, and June 3rd, 1873, G. E. S. Fryer shot the noteworthy rounds of 127-639 and 126-622.

Bramhall ranks second to Ford in private practice scores, though he always fell off sadly in great meetings. His best single York was made on November 25, 1851: 61-317, 41-223, 23-135::125-675. Although he is eclipsed by being a contemporary of Ford he was still a superb archer and the following quotation from Fisher's personal account of his shooting should be made a matter of wider record:

1849.	54	rounds	shot.	Average	103-453.
1850.	70	"	"	"	110-502.
1851.	64	"	"	"	117-561.
1852.	52	"	"	"	117-575.
1853.	38	"	"	"	114-567.

At one hundred yards he once made four consecutive golds and often three at one end.

Best score at eighty yards 47-273. Best at sixty, 24-172. Also 409 consecutive hits at sixty and five following golds.

Best double York, 107-535; 91-497; 48-290:: 256-1322. And yet he never reached 800 in a Grand National.

It can be easily seen that this was a hey-day of British archery and there can be no doubt that the general excellence and vast increase in scores over all that had been recorded in earlier years were due to the general adoption of the methods of Ford and to the inspiration which was the natural consequence of shooting in his company.

The greatest number of competitors ever present at an English Grand National was in 1860 at Bath when there was a total of two hundred and eight, ninety-nine ladies and one hundred and nine gentlemen.

In 1861 the Grand National Archery Society was founded. Up to this time the committee had been self-elected and there was no compulsion of legal status about the meetings. They were held more by a sort of general acquiescence than of necessity. With the formation of a definite society things were put on a stable basis, even to the extent of procuring an endowment fund.

All through the rest of the nineteenth century archery was kept up to a worthy standard. In the list of winners of the Grand National the names that appear most prominently are those of Major Fisher, Mr. Fryer, Mr. Palairt and Mr. C. E. Nesham.

Running parallel with the various courses of archery in England but in a distinctive manner of its own has been another famous society called the Woodmen of Arden. The

ancient forest of Arden of "As You Like It" was a great wood which formerly extended through Warwickshire and some of the adjacent country. At Meriden, in 1785, when the infection started by Sir Ashton Lever was spreading through England, a party of gentlemen met at the Bull's Head Inn and organized themselves into a band of archers.

There is no reason whatever to suppose that they represented any genuine continuity with the past but they were men of taste and culture and it suited their whim to pretend to revive the ancient practices of the forest and to shoot in the style of their forefathers rather than to adopt the newer vogue of much shorter ranges. Fortunately for the prestige of the Woodmen their first warden was the fourth Earl of Aylesford. His name was Heneage Finch, but as at least eight others of his line bore the same name and as all of them since his time have shown interest in archery and have been good shots themselves one is tempted to treat of them rather generically. On the earl's estate of Packington Hall many of the oaks of the ancient forest are still standing, giving a rarely romantic setting for the picturesque meetings which, in their carefully chosen phraseology, are called wardmotes.

The actual shooting is principally done at enormous distances, as I will describe in the chapter on Clout Shooting, and in spite of the standardization of archery which has occurred everywhere else in England they steadfastly refuse to change their habits.

The only distance used in target shooting is one hundred yards but even here there can be no direct comparison with similar shooting elsewhere as the target face is forty-four and one-fourth inches in diameter, goodness only knows for what reason, and is sewed to a flat straw butt with the lower edge only eighteen inches from the ground. The rings are the same, except that the old inner white is retained and the values are five, four, three, two, one, as in Scotland. Originally the butts were of turf and the present contrivances of

straw somewhat resemble them in shape. They also preserve the ancient method of shooting by time and not by the number of arrows so that no one ever knows how many shots there will be in a match nor can the score of one meeting be compared with that of another.

A wardmote must be one of the most delightful things in English archery. The Woodmen have a lovely old building called the Forest Hall which was built by the fourth earl. Around the walls of the original room are fifty aschams for as many archers, the door of each bearing the owner's crest. The walls are adorned with interesting bows and other relics and an emblazoned parchment roll containing 460 names of members for the first century of the society's existence. In 1845 a ballroom was added.

The wardmote lasts a week and is flavored with both dancing and dining, the ladies who are invited to participate being known as the Lasses of the Forest. The limit of membership is eighty and as the personnel is always kept at the highest social level the society continues to flourish in strength and happiness. Photographs appearing in a recent London paper seemed to me to indicate that it is still as strong as ever.

All other archery societies in Great Britain are outranked by the Royal Company of Archers, of Scotland. They are the King's official body-guard for Scotland and really serve in that capacity on the occasion of great official visits. Their "Gold Stick," or Captain-General, walks just behind the Gold Stick of the Life-guards at a royal coronation. Their membership numbers several hundred and the rules of the company provide very stringent qualifications for admission. The nobility of Scotland belong to it in great force and are present at its social functions, but the number of real archers is not so very large. Duff told me that when he marked for them it was hard to get more than two dozen men on the range.

Their records go back to 1676, three years later than those of the Scorton arrow meetings but of much greater impor-



*Wide World Photos*

# THE ROYAL COMPANY OF ARCHERS AND THE WOODMEN OF ARDEN

ON THE MEADOWS AT EDINBURGH  
AT PACKINGTON HALL  
SHOOTING FOR THE KING'S PRIZE





tance. In 1703 they received a charter of incorporation from Queen Anne, which stipulated that as a reddendo, or service to be performed on request, they should present a pair of barbed arrows on Whitsunday.

In many ways they resemble the Woodmen of Arden in their shooting as they do most of their outdoor work at nine and ten score yards. At one hundred yards they shoot twenty-one ends, two arrows an end, alternately, and score as the Woodmen do, five, four, three, two, one. I think, however, that they use a standard four-foot target.

While in these two events they are almost exactly like the Woodmen, yet in addition they continue one phase of ancient archery which the latter, so far as I know, have never taken up and that is the shooting at the short butts. It is begun early in October and forms a very agreeable form of amusement during the bad weather of the winter. Their butts, for they extend the meaning to include the whole place, is a covered-in range twelve feet wide and twelve feet high, glazed from roof to floor along one whole side. The ends are tightly packed with straw and it is lit with electric lamps in the roof over the targets. The actual shooting length is one hundred feet. On the straw an ordinary four-foot target is placed which is covered with a white face. At four feet from the floor is fixed a four-inch piece of white paper cardboard and no arrow is in the marking if it be more than twelve inches from the pin-centre.

The headquarters of the R. C. A. is Archers' Hall, which Americans travelling in Edinburgh should visit. It contains many interesting relics, among which is the Flodden Bow, the oldest undamaged bow in Great Britain. It had been preserved for centuries in a house near Flodden Field and its strength is estimated at between eighty and ninety pounds. It is a rather rough yew bow with many raisings for knots and without handle or horns.

We can judge pretty clearly of the state of archery in Great

Britain at the dawn of this century. Tennis had been popular for a generation and was becoming increasingly so, golf was rapidly getting to be the rage and the first automobiles were beginning to appear. With such powerful rivals archery was far from enjoying undisputed sway as a pastime of the leisured classes.

Yet sixty-eight active societies were listed, interclub matches were fairly frequent and there were held annually the big public meetings of the Leamington and Midland Counties, Crystal Palace, Grand Western, Grand Northern and Grand National. In all of them the scores for men were very mediocre, in fact no double York round at the Grand National has reached 900 from 1891 to the present time. The outstanding feature during this period was undoubtedly the splendidly sustained shooting of Miss Legh.

During the years from 1900 to 1915 there was but little change. The matches with, or without, the French took place at Le Touquet, as will be described in the chapter on French archery, and in 1908 fifteen Frenchmen appeared in London to take part in the archery division of the Olympic Games.

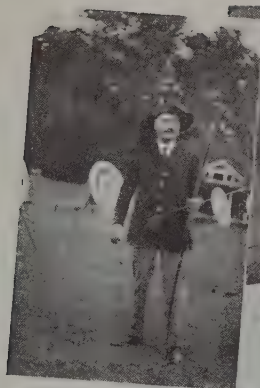
Our only American entry in the Olympics was Henry B. Richardson. There were fifteen Englishmen in the competition, which suggests that they and the French may have agreed to that limitation. In the York round the first three scores were:

Mr. Dod, Welford Park, 70-292, 71-299, 44-224::185-815.

Mr. Brooks-King, West Som., 68-250, 72-300, 44-218::184-768.

Mr. Richardson, U. S. A., 60-248, 67-291, 43-221::170-760.

Two days after the close of the Olympic Games the Grand National was held, an event which particularly interests us Americans because it was the first occasion of that sort in



BRIGADIER GENERAL MACQUOID  
 ARCHERS HALL OF R. T. S. IN REGENT'S PARK  
 CAPTAIN HOGG, CHAMPION OF R. T. S.  
 MAJOR WILLIAMS-THOMAS, CHAMPION OF ENGLAND  
 OLD RANGE OF R. T. S. IN REGENT'S PARK  
 RECESS AT GRAND NATIONAL, 1932



## ARCHERY AS A SPORT IN BRITAIN 119

which one of our countrymen competed. There were ninety-five ladies and fifty-three gentlemen. The first two scores were:

H. B. Richardson, U. S. A., 88-362, 75-335, 38-174::201-871.

R. Brooks-King, W. Som., 77-319, 72-342, 43-209::192-870.

The championship was awarded to Mr. Brooks-King, for Richardson, although the acknowledged winner of the meeting, was not eligible for the championship of Great Britain because of Rule 17 of the G. N. S., passed the evening before the meeting, which limits that honor to those born in Great Britain or to those born abroad of British parents.

On July 29th he took part in the two hundred and thirty-fifth competition for the Antient Scorton Arrow, being, to the present time, the only American ever to shoot for that historic trophy. Only five men competed. *The Field* said of him: "Mr. Richardson shot in great form and made the highest in hits and score that has ever been recorded." In the four hours of shooting at 100 yards there were 178 arrows, the best two scores being:

H. B. Richardson, 162 hits, 452 score, 9 golds.

C. H. Coates, 61 hits, 269 score, 5 golds.

After this Olympic year not much of importance occurred until the war.

The five great public meetings were held as usual in 1914 and then archery entered its four years' sleep with Mrs. S. Harold Armitage as championess and Hugh P. Nesham as champion, felicitously following in the footsteps of his famous father, Charles E. Nesham.

The last shooting of which I can find any record was by the Archers of St. Augustine's, at Canterbury, on October 7th,

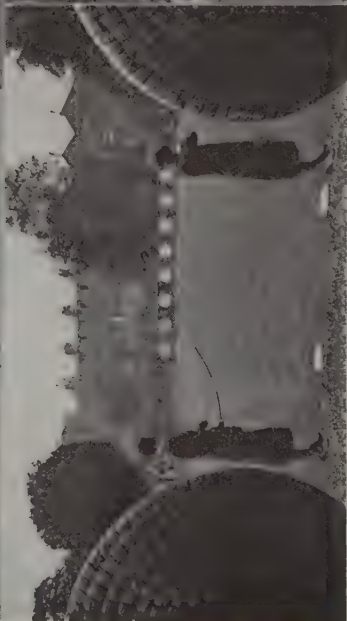
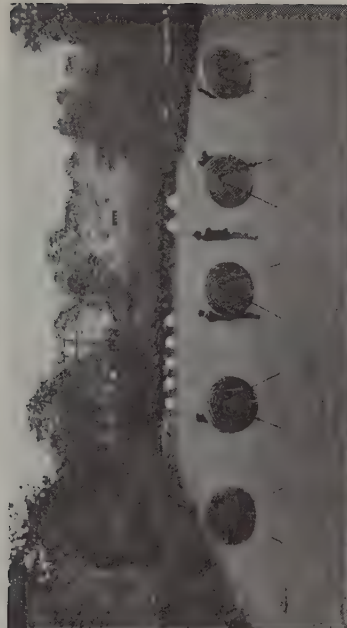
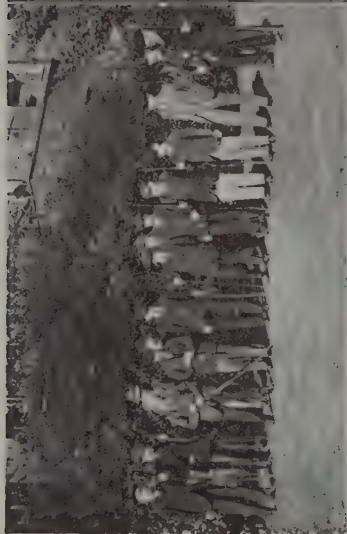
1914. Of the three men who participated one was Major (then Captain) Chapman, who won the championship in 1922, but who, during the war, won the far greater honor of D. S. O.

After the war archery was resumed in 1919 and the Grand National was held on August 1st with seventy-three entries, a number which seemed very small to the English though large to us Americans. The other great public meetings were also revived. The Scorton Arrow was not shot until 1925. It seems to me that it is almost a duty that the English archers owe to the whole fraternity of the bow to continue this old classic.

In England there are many archery clubs at the present day, but none stands higher than the Royal Toxophilite Society, of which the Duke of Portland is president. For eighty-nine years, from 1833 to 1922, the society occupied a ground of six acres in Regent's Park, laid out in such gardening as only the English can achieve. On it stood a substantial Archers' Hall which, even at the values that were current a century ago, cost about forty-five hundred pounds. The walls of the main room were hung with trophies of archery's past, including the bow of Mahmoud Effendi and the shield of Catharine of Braganza, while beneath were rows of aschams adorned with their owners' crests.

The noblest traditions of archery were preserved in those ideal surroundings, the York round in particular being retained as the true test of skill. Late in 1921, when the restlessness of post-war conditions was destroying so much of traditional value in English life, His Majesty's Commissioners of Woods and Forests suddenly ordered their loyal tenants to vacate and surrender the shooting field and venerable hall, alleging that they were better made into public tennis courts and a refreshment room. Critical as was the situation, it was bravely met and the society was enabled to carry on by the acquisition of a new range in the heart of the West End of





THE ROYAL TOXOPHILITE SOCIETY  
PRESENT GROUNDS



## ARCHERY AS A SPORT IN BRITAIN 121

London, the address of which is 9A Albion Mews East, Hyde Park, W.2. For the details regarding it I am indebted to one of the members and I will use his own words in description.

“Within a bow shot of the northern boundary of Hyde Park there used to be an ancient and disused cemetery, filled with graves to its utmost capacity. Just prior to the war this had been dismantled and the tombstones, on which the names are mostly unreadable from age, were duly numbered for record and stacked against the boundary walls. During the war, the ground was given over to allotment holders to cultivate in order to increase the vegetable supply of London, but on conclusion of the war, the majority of the holders gave up their allotments, though a few still hang on. After the war, our Society was compelled to give up its old Archers' Hall and Shooting Ground in Regent's Park and was at a loss to find a new site. It so happened that the ecclesiastical authorities had the idea of turning the now dug up cemetery to use by laying it out as a sports ground for Church Clubs, etc. This coming to the notice of one of our vice-presidents, Lord Revelstoke, he generously proposed to turf, at his own expense, ground for sports purposes if, in return, the church authorities would lend the R. Tox. a part of the ground sufficient for archery. The offer was accepted and hence our occupation of the 'graveyard.' Visitors from America and Canada like the site situated, to them, in old world surroundings, and where, after all, is there another city in the world in the centre of which Archers would be so fortunate as to have the use of a ground conveniently available and giving the full length of one hundred yards?”

Since the war, for the first time, ladies have been admitted to full membership in the R. T. S., a wise and generous move which is in line with modern tendencies in all sports.

In 1932, the want of a suitable body to represent the collective archers of Great Britain in matters of foreign concern,

resulted in the formation of a General Council for International Archery, with power to represent Great Britain, to deal with all international questions relating to archery and to appoint delegates to international congresses. Being, in effect, a general committee, it was to be composed of a patron, a president, six vice-presidents (three of each sex), twelve members (six of each sex), and eight ex-officio members, one to be nominated by each of the following societies: The Royal Company of Archers, The Woodmen of Arden, The Royal Toxophilite Society, The Grand National Archery Association, The Grand Western Archery Society, The Southern Counties Archery Society, The Midland and Northern Archery Society, and the editor of *Archery News*. The first president of the G. C. I. A., for so it is abbreviated, is the Right Honorable Lord Revelstoke.

Ever since the mutual participation of our nations in the war there has been a growing feeling of brotherhood between the archers on either side of the water, and I think everything should be done to foster so pleasant a relationship. Americans are now travelling abroad in unprecedented numbers every summer. Why do not those who can draw a bow, no matter with how little skill, make themselves known to their English colleagues, for archers should be friends everywhere?

Let us never forget the lines which the Committee of the Grand National Archery Meeting, in the first year of their existence, selected as their motto. They occur in a ballad called "The Pindar of Wakefield's Legend," which was written by J. Hughes, of Donnington Priory, a member of the West Berkshire Archers:

"Stout arm, strong bow, and steady eye,  
Union, true heart, and courtesy."

### ENGLISH RECORDS

List of ladies and gentlemen who have won the champion-

# ARCHERY AS A SPORT IN BRITAIN 123

ship of Great Britain from the first tournament in 1844 to the present time.

Year	Place	Ladies	Hits Score	Gentlemen	Hits Score
1844	York	None shot.		Rev. J. Higginson	53-221
1845	"	Miss Thelwall	48-186	Peter Muir	135-637
1846	"	None shot.		Mr. Hubback	117-519
1847	Derby	Miss Wyld	65-245	Peter Muir	153-631
1848	"	Miss J. Barrow	47-167	E. Maitland	135-681
1849	"	Miss Temple	55-189	Horace A. Ford	176-702
1850	Edinburgh	Mrs. Calvert	47-161	"	193-899
1851	Leamington	Miss Villiers	108-504	"	193-861
1852	"	Miss Brindley	84-336	"	188-788
1853	"	Mrs. Horniblow	89-365	"	202-934
1854	Shrewsbury	Mrs. Davison	109-489	"	234-1074
1855	"	"	115-491	"	179-809
1856	Cheltenham	Mrs. Horniblow	109-487	"	213-985
1857	"	Miss H. Chetwynd	128-634	"	245-1251
1858	Exeter	Mrs. Horniblow	101-457	"	214-1076
1859	"	Miss Turner	122-630	"	205-951
1860	Bath	Mrs. E. Lister	112-550	George Edwards	188-886
1861	Liverpool	Mrs. Atkinson	113-575	"	175-745
1862	Worcester	Mrs. Horniblow	128-660	"	194-902
1863	Oxford	"	116-478	Peter Muir	179-845
1864	Alexandra Palace	Miss Betham	129-693	George Edwards	189-897
1865	Clifton	"	124-606	E. A. Holmes	174-788
1866	Norwich	"	130-662	George Edwards	192-900
1867	Brighton	Mrs. Lister	130-696	Horace A. Ford	215-1037
1868	Hereford	Miss Betham	128-672	Rev. W. Rimington	187-807
1869	Birmingham	Mrs. Horniblow	123-629	"	191-909
1870	Bath	"	134-700	E. A. Holmes	183-807
1871	Cheltenham	"	138-746	Capt. C. H. Fisher	205-955
1872	"	"	136-660	"	175-771
1873	Leamington	"	142-764	Major C. H. Fisher	198-898
1874	Winchester	Mrs. Pond	132-644	"	193-873
1875	Richmond (Surrey)	Miss Hollins	133-693	G. E. S. Fryer	198-876
1876	Sandown Park	Mrs. W. Butt	138-752	H. H. Palairot	181-773
1877	Doncaster	"	126-676	Rev. W. Rimington	163-703
1878	Tunbridge Wells	Mrs. Marshall	132-692	H. H. Palairot	202-932
1879	Cheltenham	"	130-708	R. Walters	187-729
1880	Shrewsbury	Mrs. Horniblow	133-593	H. H. Palairot	195-897
1881	Sutton Coldfield	Miss Legh	139-763	"	191-849
1882	Leamington	Mrs. Piers Legh	134-750	"	195-885
1883	Cheltenham	"	138-712	C. J. Longman	193-869
1884	Windsor	"	135-701	C. E. Nesham	208-902
1885	Great Malvern	"	135-749	"	211-917
1886	Bath	Miss Legh	136-726	"	202-1022
1887	Cheltenham	"	141-773	Major C. H. Fisher	199-849
1888	York	"	136-732	C. E. Nesham	172-820
1889	Oxford	"	128-690	Mr. Gregson	198-832
1890	Southampton	"	138-798	C. E. Nesham	207-921
1891	Worcester	"	138-798	F. L. Govett	188-818
1892	Eastbourne	"	140-804	G. E. S. Fryer	202-850
1893	York	Mrs. C. Bowly	139-779	Mr. Gregson	172-656
1894	Cheltenham	"	133-823	Rev. E. W. Hussey	185-787
1895	Hurlingham	Miss Legh	138-790	G. E. S. Fryer	184-872
1896	Bournemouth	Miss B. Oakeley	123-559	"	187-815
1897	Great Malvern	Mrs. C. Bowly	131-711	"	173-719
1898	Oxford	Miss Legh	143-825	C. J. Perry Keene	190-868
1899	Brighton	"	137-767	Rev. Eyre W. Hussey	184-848
1900	Edgbaston	"	132-658	R. Brooks-King	190-804
1901	Cheltenham	Mrs. C. Bowly	123-645	Rev. Eyre W. Hussey	158-758
1902	Clifton	Miss Legh	137-813	R. Brooks-King	181-767
1903	Edinburgh	"	142-802	"	189-767
1904	Great Malvern	"	143-841	J. Penrose	202-814
1905	Southampton	"	141-807	J. H. Bridges	184-838
1906	Oxford	"	137-779	R. Brooks-King	173-779
1907	York	"	143-809	H. P. Nesham	193-865
1908	Oxford	"	138-798	Henry B. Richardson	201-871
				R. Brooks-King	192-870
1909	Great Malvern	"	141-789	W. Dod	195-891

<i>Year</i>	<i>Place</i>	<i>Ladies</i>	<i>Hits Score</i>	<i>Gentlemen</i>	<i>Hits Score</i>
1910	Clifton	Mrs. Wadworth	139-753	R. Brooks-King	193-889
1911	Brighton	Miss Q. Newall	141-803	W. Dod	199-885
1912	Cheltenham	"	136-716	R. Brooks-King	187-829
1913	Edgbaston	Miss Legh	135-703	"	183-857
1914	Cambridge	Mrs. Harold Armitage	137-723	H. P. Nesham	189-787
1915	WAR.				
1916	"				
1917	"				
1918	"				
1919	Great Malvern	Miss Hyde	125-579	T. H. Langford-Sainsbury	145-639
1920	Bath	Mrs. R. Sandford	135-697	C. K. Philips	185-809
1921	Cheltenham	Miss Legh	129-583	W. Inderwick	146-614
1922	Oxford	"	120-584	Maj. G. A. E. Chapman	174-738
1923	Cambridge	Mrs. Boddam-Whetham	121-523	R. Brooks-King	168-688
1924	Oxford	Mrs. Shillito	118-580	W. Inderwick	188-880
1925	"	Miss N. E. Wallace	125-615	Maj. J. J. B. Farley	163-717
1926	"	"	135-711	R. Brooks-King	184-762
1927	"	Miss V. M. Rushton	141-749	H. A. Cox	193-873
1928	"	Mrs. Atkinson	129-683	"	172-728
1929	"	Miss V. M. Rushton	139-747	"	172-728
1930	"	Mrs. R. Sandford	135-727	Maj. F. Williams-Thomas	175-721
1931	"	Mrs. Atkinson	128-664	Maj. F. Williams-Thomas	211-977
1932	"	Mrs. R. Sandford	129-663	Maj. F. Williams-Thomas	188-782

NOTE: The system of awarding the championships by points was used for the last time in 1927. In 1928, and since, they have been given for greatest score.



### III

#### ARCHERY IN AMERICA

OF course archery in the United States, for that is the part of America to which I expect to confine my narrative, should begin with the American Indian. He was the real, aboriginal archer of this continent, using the bow daily in his search for food and in warfare as one of his chief weapons. Every tribe from ocean to ocean depended to a greater or less extent on the bow, according to whether they lived almost entirely on meat, as the Indians of the plains did, or mostly on meat but partly on fish and vegetables, like the savages of the eastern forests and shores, or almost entirely on the products of agriculture like some of the Pueblo Indians of the Southwest.

With the tendency to aggrandizement which is inherent in tradition the skill and prowess of the American Indian as an archer have been greatly exaggerated. I have known a good many men who were in close intercourse with the Indians during their childhood, most of the savages being either in their original state of culture or still very near it, and all agree that while the red man was a marvellously good hunter he was not a good shot with the bow as we judge of proficiency. It is true that he could feast where better archers would starve but it was because his skill enabled him to get so close to his prey that he could shoot at very short range with almost certain effect. Thus Catlin shows the plains Indians crawling up close to a herd of buffalo with the skins of wolves thrown over their backs, or riding mustangs so close to the great beasts that they discharged their shafts from a distance of only two or three feet. So, in the eastern woods an Indian would lie beside the runway to a salt-lick or grazing ground and shoot the deer as they passed by.

It was undoubtedly true that some Indians were much better shots than others. Nothing else could reasonably be expected. A feat which everyone remembers, who has read *The Witchery of Archery* is almost miraculous and, as that wonderful little book, which we shall see later had as much effect on archery as *Uncle Tom's Cabin* had on the Civil War, is now very scarce, I will transcribe the anecdote in Maurice Thompson's inimitable words:

"It was while I lay thus that Tommy gave the finest exhibition of archery one may ever expect to see—the finest perhaps ever seen by anyone. An albino fish-hawk, almost snow-white, came drifting over us, high up in the calm reaches of mellow sunshine. Tommy let fall his paddle on the bottom of the canoe, and seized his bow and an arrow, stringing his weapon almost instantaneously. For a moment he steadied himself, then fixing his keen eyes on the bird, he drew with such power that the huge muscles on his arms writhed into dark knots and kinks, and the tough wood of the bow seemed ready to break. When he let go the arrow fairly screamed through the air. I could not follow its flight, but I saw a ring of white feathers suddenly formed above the great bird, heard the 'chuck' as it whirled over and came tumbling down to the water impaled on the shaft!"

Tommy represented the best of aboriginal archery. I cannot resist the temptation to give the description of his outfit.

"His bow was the stem of a small sapling split in halves, with very little finish; but his arrows were a wonder of exact work and feathered on the true scientific principle. I could not bend his bow in the slightest, and, when he had braced it, it would have taken the balls off my fingers to have drawn an arrow to the head on it, yet his great horny hands used it without trouble, sending an arrow of his make full as far as I could, with my bow, shoot the best Highfield target shaft. My hickory hunting arrows, made at great expense by a cunning carpenter, under my own direct supervision, and

pointed by a smith of approved skill, were appreciably less nicely adjusted than his. You could easily discover the difference, watching their flight through a long shot over open ground. Here was a triumph of savage cunning and skill over enlightened science and art. This fine finish is not common to Indian arrows. Most of the missiles in the quivers of Sioux, Navajos, and Comanches are detestably rough and unreliable things."

A few years ago, at Boston in 1913, I heard Will Thompson say the same thing most emphatically and insist that good shooting by the Indian was very rare.

From *Hunting with the Bow and Arrow*, by Pope, I will quote the best score made by Ishi, the last wild California Indian, who had depended on the bow all his life, was a hunter of unsurpassed skill and made weapons of exquisite accuracy with points as finely finished as jewels.

Shooting the American Round many times with Dr. Pope, while he was a janitor at the museum, his best two scores were:

10-32	13-51
20-92	17-59
19-99	22-95
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49-223	52-205

Yet, undoubtedly, we judge Indians by unfair standards and expect accuracy at long ranges and under conditions which were never practiced because of their lack of utilitarian value. I can quite readily understand what Ishi meant when he told Dr. Pope that he could not hit one of our standard targets because it was too big.

An experience of my own strengthened my views on this point. In 1929 my family spent the summer on the Canadian side of Lake Huron in a cottage beside the Sauble River. On the opposite bank was a small reservation of Huron Indians,

one of whom, a splendidly preserved man of more than seventy years, was known to the whites as Ed Thompson. One day he stopped at our door and told me that he had heard that I had a bow and arrows and that he had come to teach me how to use them. Imagine how delightedly I welcomed this chance to see a voluntary exhibition of aboriginal archery! The only tackle that we had with us belonged to my daughters, a steel bow of thirty pound weight and the best footed arrows, but they seemed to be satisfactory to Ed, who examined them with evident interest and handled them in a way that to any archer would foretell proficiency. In order to make the test as fair as possible, I asked Ed to choose his own mark. Saying that most of his shooting in the old days had been at squirrels and such small animals, in order to save the cost of gunpowder, he picked up a playing card and stuck it in the sand as deep as the centre pip at a distance which I afterward paced off as about 23 yards. Quickly as a flash he shot at it twice and hit it both times, using the assisted pinch draw and not pausing one second for aim. Such a method might have caught an animal on the run. Mrs. Elmer then came out of the house, in answer to an excited call from me, and Ed, naturally increasing his effort, overshot the mark with the next arrow by perhaps an inch. The fourth hit again, and fairly. I then essayed to shoot in our American style but could not hit the card at all in the four shots, although, of course, I was close. In other words the Indian had his three squirrels, or birds, for supper, whilst I must go hungry.

As a test for larger game I then pointed to a dead branch of cedar which lay behind a low ridge of sand between forty and fifty yards away, showing enough to look not unlike the back of a deer. Ed shot at it twice, in the same swift way, and both shafts drilled clean through the middle not more than half a foot apart. As the archer (and no one would deny him the title) softly slid into the forest trail with a pocket



WATER COLOR FROM THE SCRAP BOOK OF THE UNITED BOWMEN OF PHILADELPHIA,  
SHOWING THEIR FIRST UNIFORM





full of cigars and a flickering grin on his stolid face, he turned once more to say that he would come again to teach me how to shoot. I thanked him very meekly.

In the second year of the Revolutionary War, when we were in desperate straits to provide the soldiers with weapons, Benjamin Franklin said in a letter to General Lee, "I still wish, with you, that pikes could be introduced and I would add bows and arrows: these were good weapons not wisely laid aside." He added that the accuracy of the bow was as great as the musket, it had no smoke and could easily be procured.

If the suggestion had been carried out the result would have been disastrous. In the hands of men who knew its worth and had been trained to its use from childhood the bow was a mighty weapon, but for a mob of undisciplined farmers such as our Revolutionary troops still were in 1776 it would have been of no value. The one thing that made the Americans win was their morale. What would have been their feelings if they had been armed only with the weapon of the savage Indian, who was already a memory in this part of America, and had been obliged to meet the advance of the redcoats with an ill-directed shower of arrows in answer to thundering volleys of shot?

The beginning of archery as we know it, modelled after the English game, was made by the United Bowmen of Philadelphia in 1828.

The facts concerning this club I have obtained from two sources; the first, three original books in the library of the Historical Society of Pennsylvania, which have frequently been quoted by others, and the second, a rare paper in the American Turf Register for May, 1830, which was unearthed by Charles E. Alexander, of the Wayne Archers. Four friends who made the first pact were Titian Ramsey Peale and his brother Franklin, Robert E. Griffith, M. D., a famous physician, and his friend Samuel P. Griffiths, a druggist.

Titian R. Peale was born in 1800 and, when nineteen, accompanied the expedition under Major Long which was sent by the United States government to explore the region from the Mississippi to the Rocky Mountains. His official position was that of assistant naturalist and his artistic ability was used in drawing various forms of wild life. From the Indians he is supposed to have learned to love the grace and beauty of the bow. When he returned, after six years, the life of a young gentleman of fashion evidently palled on him and he says of himself that "feeling the want of exercise and disliking billiards and tenpins, a few friends of mine joined in choosing archery before breakfast and a walk in the country."

In the fall of 1827 Dr. Griffith and a friend, probably Griffiths, "discussed, over a bottle of good wine, the establishing of an archery club and in a few days added to their number the two Mr. Peales," but it was not until September 3rd, 1828, that they formally organized the United Bowmen.

What kind of bow Peale had already used before breakfast I do not know but the early attempts at bow-making by the United Bowmen were most peculiar. The first weapon was a sort of modified wagon-spring of three slender slats, only one-eighth inch thick and six feet or less in length, bound together without glue to allow free play. It was one and three-fourths inches wide in the middle, tapering to one-half inch, and each inner slat was six inches shorter than the one above it. This discouraging effort was followed by a flat bow of red cedar which bulged on the right side and was straight on the left, to allow for the "Archers' Paradox," which is discussed on page 241. They broke twenty-two of these before they learned to stay the havoc by backing them with parchment. Finally they imported a complete set of a bow and arrows from England, paying no less than ninety dollars for it, which would be equivalent to perhaps four times that sum now.

The four charter members soon elected other serious young



CHARCOAL SKETCH OF THE UNITED BOWMEN OF PHILADELPHIA, 1834



men of the best social circles and the club started on the longest career that any American archery society has ever known, exactly thirty years of active shooting and thirty more of fraternal existence. The limit of membership, which was never quite filled, was set at twenty-five and from 1828 to 1888 the grand total was fifty-seven. In the latter year the survivors held a final meeting and deposited their handsome prizes and records with the Historical Society of Pennsylvania.

That such a unique and charming society should sink into oblivion, however, was too lamentable to be permitted and so, on October 2, 1932, it was revived by another band of archer friends who, with the enthusiastic approval of the Historical Society, continued the name, constitution and "regulations," even to using the ancient style of shooting on formal occasions. Thus, the targets are in opposed pairs as in England, but otherwise they differ from those of both the mother country and America, being, in fact, as independent of convention as those of the Woodmen of Arden. They are only forty inches in diameter, with an eight-inch bull's-eye and four-inch rings, and are colored gold, red, white, black and blue. The values are the usual Prince's Reckoning. The constitution provides that all shooting must be at not less than sixty nor more than one hundred and twenty-five yards, but in actual practice the range is usually eighty yards. Three arrows are shot down and three up, thus making a "round," of which there are fourteen, with a recess for refreshments after the seventh. The whole thing is a relief from the crushing standardization of modern life.

As the Librarian of the Historical Society pointed out, a good many other old institutions of Philadelphia, as the William Penn Charter School, the *Saturday Evening Post* and the *Pennsylvania Gazette*, slept in the tomb for long periods of years and yet, on revival, were considered to be not merely reincarnated but actually identical. We pray for a like in-

dulgence of sentiment, especially as one of our members is of the family of Tĭtian R. Peale.

When but two years old the Bowmen published *The Archers' Manual, or the Art of Shooting with the Longbow as Practiced by the United Bowmen of Philadelphia*. While they frankly acknowledged their indebtedness to Ascham and Waring they recorded many original observations; for example, they made their strings of silk, their arrows of white holly, and their feathers of the eagle, swan and blue heron. Each archer had a simple mark which was placed on all his property. Tĭtian Peale's was a circle, Franklin's an eagle, others' a heart, zodiacal signs and so on. I have a great number of bows and arrows which belonged to one of their number, Mathias W. Baldwin, founder of the great Baldwin Locomotive Works, all of which are marked with his sign, a triangle. He joined in later years when the white holly had evidently been discarded for coniferous woods.

The first shooting field was at "Bush Hill," a military parade ground at what is Twentieth and Fairmount, where they had a lodge, with an ascham for each member. The growth of the city forced them to use, successively, the lawns of different members in what is now Fairmount Park, but in 1859 the secretary entered the terse line, "No grounds, no shooting."

The display of their handsome trophies at the Historical Society should be seen by every archer who visits Philadelphia. The chief piece is a superb bowl of Georgian silver, which would awaken envy in the heart of any collector. The name of each member, with his year of election, was engraved on its inside, while every winner was required to embellish the outside with a silver acanthus leaf. Silver cups were given to the second and third men and a short dart, or silver arrow to the *sixth*. Medals for permanent possession were also awarded, two of which have been recovered and are now used



by the National Archery Association as emblems of the championships for men and women.

In later years they shot from under a great pavilion, or tent with wings, supported by twenty-five poles, each with the flag of a member flying from it. Once a year they also had a picnic, where they shot at a popinjay until someone hit it on the head, and afterward at rovers.

When the United Bowmen stopped shooting it marked the end of organized archery in the United States for about twenty years. Just how much the approaching Civil War had to do with it is hard to say. While the reason for quitting was declared to be the lack of a range, it might have been that if the attention of the members had not been distracted by the tumultuous political conditions, and their spirits dampened by a period of intense financial depression, they would have had enough interest to hunt for a new shooting field.

There were two very young gentlemen from Georgia in the Confederate army whose participation in the great conflict was destined to bring about the popularization of archery in the United States to a degree that would have been thought impossible. They were Maurice and Will Thompson and as I heard Will tell the story, it was about like this:

Maurice was wounded in the chest near the end of the war, and as soon as he was able to walk he and Will started for home on foot. When they got there, after peace had been declared, they found that Sherman, in his march to the sea, had laid the whole plantation waste. They had no money and their old doctor told Maurice that on account of his thoracic lesion he should live in the open air. Firearms were denied them because of their recent belligerency and so they went out into the woods, chiefly of Florida, and lived for the most part on game that they killed with the bow and arrow.

Will Thompson, at the time I heard him, was a prominent attorney in Seattle, Washington, and was possessed of an easy and beautiful eloquence. He told how they scraped the bows

down with knives and stones and rubbed them with sand to make them smooth, simple and natural procedures enough, but his peculiar gift of speech seemed to give everything a sort of glamor of pathos and romance. Maurice possessed this gift to an even greater extent than Will. A few years later he wrote a series of short stories on his experiences which were published in *Harper's Magazine* during 1877 and 1878 and which were afterward collected together in a volume called *The Witchery of Archery*. At that time the only outdoor game was croquet, nearly as bad a state of affairs as in the time of Titian Peale when the only games were tenpins and billiards. Excited and interested by the charm of Thompson's stories people welcomed archery with eager enthusiasm as a real sport, the first to enliven the placidity of mid-Victorian life.

In the intervening years the bow had not absolutely disappeared from private lawns and there may have been a few small clubs. John Preston True, the author, tells me that in 1867 his sister shot the bow while a student at Bradford Academy, Mass., and that in 1875 he organized an archery club at the Gould Academy in his home town of Bethel, Maine. Doubtless many elderly people harbor similar memories.

In 1878 and 1879 so many archery clubs sprang into existence that some old men say they were to be numbered by the hundred. In looking over magazines and scrap-books of that time I am left in doubt as to whether or not this is an exaggeration. Certainly there were more clubs than at any other time until quite recently, but a complete list I have never been able to find. Yet it must not be forgotten that nearly every man of sufficient age will tell you that there was an archery club in his town in 1880.

The idea of organizing an association on the plan of the Grand National Archery Society of England, to connect the activities of all the clubs, was conceived by Henry C. Carver, of Chicago, and was carried out by him. The officers of the



MAURICE THOMPSON

1879



WILL THOMPSON  
Wearing Championship Medal



Chicago Archery Association in the fall of 1878 were H. C. Carver, President, A. G. Spalding, founder of the great house of athletic outfitters, Vice-President, and Edward L. Brewster, Secretary. Pursuant to a call from them a meeting was held in the office of the mayor of Crawfordsville, Indiana, at 10 A. M., January 23, 1879. Representatives were present from

The Wabash Merry Bowmen, Crawfordsville.

The Chicago Archery Association, Chicago.

The Kokomo Archers, Kokomo, Indiana.

The Highland Park Archery Club, Highland Park, Ill.

The Toxophilites, Des Moines, Iowa.

The Nottingham Archers, Pittsburgh, Pa.

The Buffalo Toxophilites, Buffalo, N. Y.

The Robin Hood Archery Club, De Pere, Wis.

Thus it is apparent that interest was both wide-spread and genuine.

An organization was formed by the name of The National Archery Association of the United States, the first president was Maurice Thompson, the first secretary Henry C. Carver, Esq., who did all the work, and the first tournament was scheduled to take place at Chicago in August, 1879.

That tournament, held in White Stocking Park, Chicago, was a very grand affair. Gotten up, as it was, by a very wealthy young man who stopped at no personal expense and who was filled with the hustling spirit of the expanding West, it was staged on a scale so elaborate that it nearly wrecked the cause it was meant to foster. No one else had the courage to assume a responsibility that had been made so great.

The total number of contestants was eighty-nine, divided between twenty ladies and sixty-nine gentlemen, a figure not equalled again until 1926.

The arrangement of the field showed no end of painstaking originality. As there was no precedent to follow everything had to be either modelled after English patterns or designed

on entirely new lines, yet no tournament ever ran more smoothly.

The ground was the baseball field of the Chicago White Sox, or Stockings, as they were called then, and of course the visitors would naturally sit in the grand stand. This immediately led to the abolition of the two-way shooting which still prevails in England. The shooting line was in front of the stand at a distance of twenty feet. There were eight targets for the men and two for the women. The double York and double Columbia were the two rounds shot and as the ladies were gallantly considered to be the chief objects of the spectators' interest, their targets were placed in the very centre, with those of the men reaching out on either side. Indeed feminine participation in outdoor events was so unusual at that time that it took some courage on the part of the ladies to exhibit their skill in public.

The kind of target and the values of the rings were exactly as they are at present. Beside each target was a board, four feet wide and six feet high, which was marked for identification with a large letter. Behind it sat a boy in a chair, who had a set of discs about as big as the gold, each mounted on a stick and painted a color of a ring. As each arrow hit the target he lifted the corresponding color above the board and the result was noted on a score pad by the scorer.

After each end the arrows were brought back in baskets by the markers.

While the shooting was in progress the finest band in Chicago played. Society was out in strength and plentiful refreshments were served. Yet where were green lawns and great trees, smart uniforms, as of fifty years before, or sport clothes as of to-day? An unpainted grand stand, the bare ground or worn turf of a poorly kept baseball field and a back-fence of huge advertisements! Sometimes realism is disillusioning.

The prizes were more than a thousand dollars in money and





FIRST TOURNAMENT OF THE NATIONAL ARCHERY ASSOCIATION, CHICAGO, 1879  
WILL THOMPSON IN CENTRE FOREGROUND



so much merchandise that Will Thompson, who won nearly everything, took it away in two large wagon loads.

In spite of the great difficulty of following so elaborate a precedent the presidency was assumed by Frank Sidway, a fine archer of Buffalo. At this second tournament the targets were set in the English style, facing each other, which necessitated ends of three arrows each, and the championships, for this one and only time, were decided by gross score and not by points.

The third meeting was at Brooklyn under the presidency of Major Constable, an English gentleman of military bearing, who wore a double-visored helmet of the type which used to be shown in caricatures of English travellers, and who therefore figured prominently in the newspaper illustrations. Homer S. Taylor, the dean of American archers, who was present as a spectator only at the first tournament, was at this one as a contestant. He tells me that on the first day a terrific storm came up which blew down the targets and turned that portion of Prospect Park into a veritable lake, yet on the following day everything had been fixed up so spick and span that no one could have told that an accident had happened. As the Major was true to every tradition of the mother country the targets were again placed in pairs and the excellent change was made of deciding the championship for ladies by the National round rather than by the Columbia.

The next year, at Chicago, Mr. Taylor won the first of his three championships, the last being twenty-eight years later. It is but fair to say, however, that it was by points, Mr. Nash, of Brooklyn, making a higher score.

This reversal of the result has occurred three times in the history of the National Archery Association as follows:

<i>High Scorer</i>		<i>Winner on Points</i>	
1882	D. A. Nash.....	167-713	H. S. Taylor..... 168-678
1888	L. W. Maxson.....	171-739	W. H. Thompson..... 175-733
1913	G. P. Bryant.....	176-832	Dr. J. W. Doughty.... 178-802

In this year the flight shoot for both men and women was introduced.

As the teams of both sexes from Cincinnati had won their rounds at Chicago, bringing their city into the limelight, the next tournament was held there.

At this meeting Mrs. Howell, who was the best woman archer of her generation in America, won the first of her seventeen championships with magnificent scores.

Col. Robert Williams also made his début with a York round which no one else beat for twenty-five years. It was the first year in which the American round was shot and the colonel also sent that away to a splendid start.

There were sixty-nine archers in the Cincinnati tournament, but at Pullman the next year there were only sixteen. Mr. Taylor tells me that for some reason the president had written around to the different archery clubs saying that there would be no meeting but then, in a sudden change of mind which is not supposed to be a privilege of the stern sex, had decided at the eleventh hour to have one. For that reason there were very few competitors except those from Chicago.

After that, for many years, the tournaments were somewhat smaller, though larger in Ohio than elsewhere, and centred either around Cincinnati where Williams, Clark and others formed a strong nucleus of magnificent archers, or around Washington, where L. W. Maxson reigned supreme.

It cannot be denied that the first five years of archery, always dating from 1879, were by far the best of the old era. That was the period in which it thrived with a genuine and luxuriant growth. After that it remained practically stationary for many years, supported by the efforts of a few real lovers of the bow. During the time I was in college I did not know that there was an archer in the whole country and it is no wonder, as I find that for two years at that time the national tournament could muster only eleven competitors, six men and five women. They were in reality the Potomac Arch-

ers and the tournament amounted to little more than a club match. We must give Maxson credit for keeping a spark of life in a body that was not much more than a corpse.

There were five great reasons for the decline of archery. The first was the inherent difficulty of the game itself, which, like chess, discourages many who lack the persistence necessary to acquire skill.

The second reason is the one which Mr. Taylor thinks was the greatest of all, the extreme difficulty, or almost impossibility, of getting satisfactory equipment at reasonable prices, to which might be added the difficulty of keeping the tackle in repair.

The third was lawn-tennis. While court-tennis, a game which most people have never seen, had been played for centuries, its cheap and easy derivative lawn-tennis had just been invented at the time of the beginnings of archery. In the United States it was first played at Nahant, Mass., and by 1881 clubs had become numerous enough to bring about the formation of a national society. Lawn-tennis is one of the best games in the world. Probably every one of us has played it at some period of his life with thorough enjoyment. It provides splendid exercise, requires simple equipment, except the court, and, above all, gives to youth the thrill of face to face conflict. The changing of the *Archery Field* of 1879-1881, to the *Archery and Tennis News* in December of the last year is a good indication of the increase of competition. Remember that just as archery was the novelty after croquet so lawn-tennis was the novelty after archery.

The fourth specific reason was the introduction of the bicycle, which became so popular that the League of American Wheelmen was seriously considered as a powerful factor in the national vote.

The fifth reason was of a more general nature. It was the ever increasing interest in outdoor exercise and the great games such as football, baseball, rowing, and, more recently,

golf, which have arisen in rapid succession to cater to the taste of each individual. While archery is the peer of any of them it must take its place in the ranks.

In those five fat years, and in some places for a short time thereafter, clubs and associations of clubs had flourished in many parts of the land but for the last fifteen years of the nineteenth century there were very few archers except a handful in each of the cities of Washington, Cincinnati, Chicago and Boston.

In the vicinity of Philadelphia the Tamanend Archers, of Montgomery County, flourished with a membership of about thirty in the early '80's. Three of the original members, William J. Moore, James Hallowell and Isaac Mather of Jenkintown, still survive and, at the welcome suggestion of Professor Claude R. Johnson of the same town, have preserved the continuity of the old club by electing to membership the large group of skillful archers who now exist in that locality. By happy coincidence the same shooting ground, the lawn of Mr. Teubner, was used in the old days as it is in the new. The good Delaware chieftain Tamanend, or Tammany, whose name has become so notorious in New York, lived near by and sold the land to William Penn.

In connection with the bi-centennial celebration of the founding of Philadelphia, in 1882, a public match was held in Fairmount Park. Ten men, from seven cities, competed in a double American round which was won by R. V. Bonnell, of Brooklyn, with 164-825. Mrs. A. H. Gibbes, of Newark, was the only lady but she made the very good score of 131-723 in the double Columbia. Maxson and Flint made the only tie ever recorded in a flight shoot, at  $276\frac{1}{3}$  yards. The newspaper says, "They took the prize conjointly to their club in Washington, which consisted of a target and stand." (The most unusual club I ever heard of.)

The Potomac Archers, who were influential for many years, were founded in 1878 by Col. John T. Pickett, of the Con-



federate Army and Andrew Johnson (not the President who died in 1875). In the summer of 1879 Pickett found Captain Bartlett, of the patent office, trying to draw a Sutton rawhide backed bow, which was presented for a patent, with his finger and thumb. When instructed beyond this elemental stage he became an enthusiastic archer and converted his colleague Maxson, who was a man of big physique and a former oarsman at Yale.

In 1903 archery took on a new lease of life because of the World's Fair at St. Louis. A. G. Spalding was at the head of the athletic program and when he was asked to place archery on the list of events he did so with a willingness that was no doubt inspired partly by his memories of twenty-five years before, when he was Vice-President of the Chicago Archery Club, and possibly in part by the fact that his company supplied all the targets and most of the tackle. It was very hard to find an archer who was willing to devote his energies to rebuilding the sport but finally Dr. Edward B. Weston, of Chicago, agreed to do it. The doctor had been crippled in a street accident some time before and had been obliged to retire from the active practice of the medical profession. His hip was broken and never wholly recovered, so that he walked with difficulty and in shooting relied on his companion to retrieve his arrows. He was a man of lovely character.

As is usual with World's Fairs this one had to be postponed a year. In the meantime Weston was working hard to find recruits and shot in the tournament at Buffalo in 1903. Out of seventy-two arrows at one hundred yards he made 2-8, thus challenging the record of John Wilkinson, who had made 1-9 the year before. Wilkinson had a keen sense of humor. After that match he made a bet with Taylor that he had a higher average per hit at one hundred yards than Taylor, who had almost gotten the championship. He won.

At this meeting Henry B. Richardson shot for the first time. He was "Harry" then, a sturdy boy of fourteen, though he

looked much older. Harry was always endowed with the invaluable asset of perfect poise. Earlier in the year he had appeared for the first time at a meeting of the Boston Archers and when asked if he wished to compete in the match he said, "Yes, but I must make a string first." Thereupon he coolly drove two nails into a tree, twisted a string and began to shoot. How many boys could do that among a group of men a generation beyond them?

The men who shot at the tournament of 1904, at the World's Fair, tell me that no one could ever forget it. The meeting was in September, the only time I ever knew that to happen, and was in the Stadium, whose floor was made of clay. Before the shooting began it rained steadily for fifteen hours, the clay held the water and the whole place became a sea of mud. Great balls of it hung to the archers' feet as they sludged to and from the targets. Planks were given them to stand on and at the end of three days' shooting some were still using them. G. Phillips Bryant appeared at this tournament for the first time and won both the York and American rounds with high scores which, though second to those made by Williams in 1883, were not excelled by another neophyte until Spencer gave us the first sample of the new archery of the far west at Philadelphia in 1926.

This was probably the closest championship in our history. Col. Robert Williams, Jr., was only one point behind Bryant with 191-819 and Will H. Thompson was third with 190-816. One arrow might have decided the issue for all three.

These sporting events, as a whole, were called the Olympic Games, although very few foreign competitors were entered in them and in the archery contest there were no foreigners at all. However, Phil Bryant and others matched their skill against that of some Igorrotes from the Philippines who had used the bow as a necessity all their lives.

They shot at a square target of boards at a distance of about forty yards and while our experts put practically all of

their arrows near the centre of the mark, which was about four feet each way, the savages were lucky if they hit it at all.

Owing to the activity of Dr. Weston, Chicago now became the headquarters of archery and the next tournament was held there with an attendance of forty-one, in which were included six men who had shot in 1879. Boston held the tournament in 1906 but only nineteen archers attended and it was then moved back to Chicago for five successive years. At Boston the outstanding surprise was the victory of Harry Richardson. Although only seventeen he won both events with ease over such able veterans as Williams, Taylor, Beach and both Bryants. The next year at Chicago he won the York again, but not the American and in 1908 he was in England. It was in 1910 that Harry made his great score of 231-1111, which stood as the American record until 1927 and which has been beaten by no Englishman but Ford. The target used by him is kept in the club house of the Chicago Archers as a cherished memento. A strong facing wind was blowing most of the time.

From this time on I do not have to rely very much on the word of others as in the fall I became interested in archery myself and since then have been closely associated with it.

It is very difficult for a physician in general practice to get a reasonable amount of exercise and play. He cannot take the time for golf, he dare not make a definite appointment with an opponent for tennis and he must keep in communication with his office. With these familiar restrictions in mind archery suggested itself to me on a hot afternoon in August, 1910.

The next day I visited a sporting goods store and, with the usual luck of a novice, received from them a fair lemonwood bow and some miserable children's toys which they called arrows. On arriving home I shot at a tree just eight yards away and missed it by three feet. My salvation lay in the fact that I had also bought a copy of the *Blue Book on Arch-*

*ery*, by Dr. Weston, one of the best instruction books ever printed. With my poor equipment I made insignificant scores but soon I plucked up courage to write to the doctor personally and so initiated a friendship which was ended only by his death.

By his advice I bought a dozen arrows of Mr. A. G. Whitman, of Melrose, Mass., an emerited professor who made them to occupy his time and to further the cause of archery, until his skillful hands were incapacitated by rheumatism. In all I had four dozen of his perfect shafts and used them in the national tournaments of 1911 and 1912.

During that first autumn, when I was receiving written instruction and encouragement from Dr. Weston, and when I had never seen a real archer shoot, I tried to follow his directions with punctilious fidelity and, as a result, I acquired a mechanical sort of technique, particularly regarding the loos-ing of the bowstring, which has stuck by me with but slight variation to the present day and, although it has never enabled me to break any records, it has given me a confident steadiness that on the whole has been satisfactory.

The best practice score I made during those first few months was thirty hits 222 score, with thirty arrows at fifty yards, and it was not until September 7th, 1917, when I made 224 in an American round which totalled 89-627 that I was able to beat it. I mention this particularly to illustrate the value of the method of shooting by a point of aim. On the first occasion I aimed not at all at the target but sighted my arrow with rigid exactness on a dead leaf which lay considerably to the right of the direct line of the trajectory.

In looking over the scrap-book which I kept in those days I find a newspaper article by Dr. Weston in which he quotes from my first letter, anonymously of course, that my arrows had cost three dollars a dozen and that when weighed on my apothecary's scales they were found to vary in weight from 266 grains to 516. The first scores of which I kept a record

were made with those paragons of exactitude and were shot at the two shorter ranges of the American round. At forty yards, with the regular thirty arrows, I made 16-41 and at fifty, 18-68. It looks as though I must have begun near the target and learned a little about shooting as I moved further back.

By the time the winter had set in I had learned two important lessons that each archer has to find out for himself, no matter whether he has been told by others or not. The first was that the sport in itself, by its very nature, finds its limitations in freezing weather. Then everything suddenly seems to go wrong; the wood of the bow becomes brittle and one's best weapon will unexpectedly fracture in his hand, the arrows will strike the frozen earth and shatter into bits as though they had hit a solid rock, the string causes agonizing pain in the tips of the drawing fingers and even the necessarily heavy clothing is an encumbrance.

The second lesson is that too arduous practice makes one stale. Even before the climatic conditions put a final stop to shooting my scores had become poorer and poorer, no matter how hard I tried to do my best. The last shooting I did, on December 10th, was one end of six arrows at sixty yards and the result of one hit in the white so disgusted me that I resolved to quit until the following spring. I wrote to Harry Richardson about my slump and in his reply he said that he had just shot twenty-four arrows at sixty yards with a score of 10-22. Remember too, that this was shortly after his breaking the record at Chicago.

These are the slumps that come once a season to every archer and experience has taught me that they are his most subtle foe. Let me warn the beginner now to so time his training that the low spot will have come and gone before the day of the crucial test, so that when he steps to the shooting line he can feel that every day in every way he is getting better and better.

During the winter I had made up my mind to shoot in the next national tournament at Chicago and so, when April came, I began studiously and with earnestness of purpose to prepare for the unknown conditions of a public match. The range that I use for the American round is in my own yard and fortunately a splendid school athletic field is right across the street, so I have the best facilities for practice. When I thought that I knew the markings of my own familiar range too well I would carry the target to the school field even for the short distances and each time put it in a different place. When shooting the York I constantly changed the location and direction also in order to get accustomed to shooting with the sun in my eyes and with the wind blowing unpleasantly. Furthermore I encouraged the small boys to annoy me by their presence and remarks so that I would not feel upset by the spectators at a public match. Trivial as it may seem, I think this last point is a most important one for the novice to bear in mind as I have seen many an archer who was used to the quiet of a sequestered range lose much of his control under the petty annoyances of competition.

The first time I shot, in that period of preparation, I made 17-85 at sixty yards. On August 10th, just before leaving for Chicago, I shot a York round of 115-579, which remains my record to the present day, and immediately following it an American of 88-558.

In this year the Pittsburgh Athletic Club had opened its magnificent new club house and on the way to the tournament I stopped there on the invitation of Mr. Postgate, the professional teacher of fencing and archery, to shoot a match with him. The range was in front of the house near some tennis courts and as Postgate drew the bow and loosed the shaft I watched him with great interest for he was the first adult archer whom I had ever seen. This little match bore great fruit, as it started those two stalwarts Owen Hertig and James Jiles. The former attended thirteen consecutive national



tournaments and the latter sixteen, stopping from illness a year before he died.

One's first experience in anything is apt to be the most vivid and every detail of that tournament in August, 1911, stands out clearly before me.

At the hotel I met a big gray-haired man coming out of the room next to mine who introduced himself as Burton Payne Gray, of Boston. He too was a protégé of Dr. Weston, in fact the doctor had been present when he first made his squalling advent into this world of sorrow, and during the summer he and I, through the doctor's kind mediation, had engaged in a friendly match by mail, each shooting on his own range and sending the result to our mentor. A firm friendship immediately sprang up between us which continued pleasantly until his untimely death about nine years later.

Two other good and lasting friends I made at that tournament, Homer Taylor and Jim Duff. Mr. Taylor was the best shot among the Chicago archers and was looked on as a sure winner, as his practice scores made shortly before reached as high as 665 for the single York round.

Duff was at his first American tournament, although he had come over from Scotland a few years before and in 1910 had given to the National Archery Association the silver arrow which bears his name. He was born and brought up in Edinburgh and learned the trade of carpenter. One day, while he was working about the front of a building, old Fergie, the great fletcher, came up and asked him if he would like a job at Archers' Hall, making bows and arrows. Jim agreed and worked there for eight years. After that he was with Buchanan in London. He is the only man in America who has learned the trade of bowyer and fletcher through the traditional methods of Great Britain. His popularity is attested by his having been made an honorary member of the N. A. A.

A new condition regarding the championship existed that year and was embodied in the printed rules of the National

Archery Association, of which I have a copy before me. From 1879 to 1910 the winner of the York round had been conceded to be the champion archer for the coming year but, in order to give equal credit to the man who preferred the shorter ranges, Dr. Weston had decreed that there should be two champions, one called the York Round Champion and the other the American Round Champion.

His authority for making this change lay in the fact that at the Annual Business Meeting in 1910 he had been empowered to draw up a new constitution which was to govern the next meeting. The words used to cover these cases were:

"Article IX. Archery Championship. This Association shall establish the Archery Championships of the United States of America, which shall be represented by suitable medals, to be contested for at each Annual Target Meeting by members of the Association only and under the following rules:

"The York Round Championship Medal shall be awarded to the individual member making the greatest number of points at the Double York Round.

"The Championship Medal for the American Round shall be awarded to the archer making the greatest number of points at the Double American Round."

The wording for the ladies' rounds was similar.

Personally I think the system is a very bad one and I was much opposed to its more recent adoption by the Eastern Archery Association in 1922. It has no effect at all in increasing the number of archers, as its advocates had presumed, and it makes it impossible to pick one individual to satisfy the popular query as to who is the best archer in the country. Nevertheless that is how the rules read in 1911 and they were not changed till after the tournament of 1914 when a new constitution was adopted and its system of scoring put into effect, for the first time, at the tournament of 1915.

In the first American round Mr. Taylor made the fine score of 87-547, but in the second American round he experienced

very hard luck. On the way to the field he had stopped in at Spalding's to buy some new strings and although they looked all right, they had become so dried out through improper storage that one after the other broke, during his shooting, until the whole half dozen were gone. What he finally finished with I do not know but his score was reduced to 81-393 and the American Round Championship was lost.

In the York round things were different. Although I thought I had trained for all sorts of emergencies there was one I was not prepared to meet, and since then I have seen many a beginner perish from the same cause. I had bought from old Mr. Barnes, of Portland, Oregon, who has long since gone to rest, a fine yew bow weighing about forty pounds. It was a sweet and accurate weapon, as all of his were, but it was not a low-shooter at one hundred yards and in the school field, at practice, I had usually aimed above the tops of the tall trees and buildings that border it. What then was I to do when I was placed on the edge of a treeless field about two miles in breadth and with nothing but a cloudless sky above? I got only 24-70 at one hundred yards, was discouraged and ended with a total of only 78-324. Hope springs eternal, however, and a good sleep and successful morning gave me a better start in the next afternoon. Then, too, I had changed to an excellent lancewood by Aldred, weighing a little over fifty pounds. At one hundred I did a little better, although I was still aiming high in the sky, but at eighty I could sight on a distant tree which was higher than the rest and made 43-209, which remained my best record until I beat it with 41-227 at the Eastern tournament at Deerfield in 1925. At sixty I made 24-156 which remains my record to the present day. Mr. Taylor got six points out of ten and the York Round Championship.

During the fall of that year archery seemed to boom all over the northern part of our country.

The Wayne Archers were organized on September 30th,

1911, with a charter membership of about ten. The organization has continued to exist till the present time and has had a successful career. Of the ladies who have scored high in club matches but never won national honors Mrs. E. E. Trout is probably the best. I have a record that in September, 1914, she shot a double American round of 86-528 and 89-519, total 175-1049. Mrs. John Dunlap, on whose beautiful lawn we had our club range for several years, on November 29th, 1913, shooting the one hundred-yard distance of the last York in a N. A. A. mail-match made an end of  $99773=5-35$ , which is probably a record for a woman. Cynthia M. Wesson was a member of the Wayne Archers during the time she made her American and world records.

In 1914 the women's team of the Wayne Archers won the national championship with the second highest score so far recorded, the personnel being Mrs. Dunlap, Mrs. Elmer, Mrs. Trout and Miss Wesson. In 1916, at Jersey City, they won the championship again.

William H. Palmer, Jr., has twice been national champion and the men's team won in 1914 and 1922, in the latter year breaking the record. In 1914 the team was composed of Allan C. Hale, of St. Davids, J. Mark Mauser, of Laury's Station, and myself, who were charter members of the club, and T. Truxtun Hare, Esq., who, while at the University of Pennsylvania, had been All-American guard for four years. In 1922 the team was Mauser, Palmer, W. H. Palmer, 3rd and myself. One or two members of the club also shot on the winning teams of the Keystone Archers.

It was in Boston that the greatest interest was aroused because of the magnetic personality and indomitable energy of Mr. Gray. Besides being a very busy attorney in Boston he found time to assume the duties of an alderman in his home town of Newton Centre and to so exert his influence that a portion of the public playground was set apart as an archery range. This wise and public spirited act has proven its wis-

dom many times over and I can see no reason why many other cities and smaller communities would not do well to follow a similar plan and lay out a tract of ground which, though long, need not be very wide, along the side of some of the many public playgrounds or in a park to be used as an archery range.

As a whole, the toxophilic aristocracy of Boston has been superior to that of any other eastern city. A sketch of them would be like this:

1. Alonzo G. Whitman. Teacher and master-fletcher. Took part in Eastern Archery Association Tournament in 1880.

2. Edward W. Frentz. Editorial Staff of *Youth's Companion*. Pupil of Whitman both in school and on the range. Master-bowyer.

3. Wallace Bryant. Renowned artist. Portrait painter. Pupil of Whitman. Champion in 1903. Teacher of many men and of Wellesley girls.

4. George Phillips Bryant. Lawyer. Brother of Wallace. Pupil of Whitman in school and of Wallace Bryant on the range. Champion in 1912 with new American record. High score in York in 1913.

5. Cyrus E. Dallin. World famous sculptor. President of N. A. A. Designer of unequalled trophies.

6. Henry B. Richardson, M. D. Thrice champion of U. S. York record. Best score, Grand National, England, 1908. Scorton Arrow record.

7. Burton Payne Gray. Lawyer. Established first public archery range. Organized Newton Archers. Revived archery.

8. Mrs. Burton Payne Gray. Champion in 1914.

9. Louis C. Smith. Lawyer. Hard and continuous worker for archery. Publishes *Bulletin*. Secretary of N. A. A.

10. Dorothy D. Smith. His daughter. Seven times champion.

11. Abner Shepherdson. Artist photographer. Master

bowyer and fletcher. Inventor of perfected jointed bow and movable sight.

12. Paul W. Crouch, D. M. D. Champion 1925, 1927. Created records.

After the tournament of 1911, archery was moved at last from its Chicago habitat through the efforts of Burton Gray, and so the season of 1912 opened in Boston. An invitation match was held at the new range of Newton Centre on Patriots' Day, April 19th, when Paul Revere and the ancestor of Vice President Dawes made their famous rides. It sticks in my mind largely because I saw Harry Richardson, practicing the day before, make three golds in succession at 100 yards.

The old veterans of former years turned out and new recruits came in, during the summer, till a goodly company were ready to face the targets at the national tournament in August. Soldiers' Field, of Harvard University, was loaned to us and proved to be ideal. The outstanding feature was the shooting of Phil Bryant, who surpassed himself by raising the record for the single American into a new century, with 90-618.

During the autumn, many club matches were held in Boston, Chicago, Pittsburgh and Jersey City, where Duff raised a band of sturdy Scots.

On the following Fourth of July, in 1913, the Wayne Archers were hosts of the Eastern Archery Association, making it the first open tournament in the vicinity of Philadelphia since the affair of the Bi-Centennial in 1882.

The Scottish-American Archers of Jersey City also held an open meeting, on Decoration Day, in connection with some Caledonian Games. It was the first in New Jersey since the E. A. A. of 1882 and in the vicinity of New York City since the N. A. A. of the year following.

In Chicago, beginning on the Fourth, a "Pre-Olympic Carnival" took place in Grant Park on the lake front, within



a bow-shot of the site of the first national meeting in 1879. The event was noteworthy because it afforded the only public appearance of a truly great archer, Edmund J. Rendtorff, professor of physics at Lake Forest Academy. A practice American round of 90-682, reported some time previously, had seemed so incredible to us archers of that day that we waited eagerly to see if such promise would hold good in competition. Under the conditions it did. With clear skies for the first York and American, the match lasting three days, he made 110-520 and 89-599 and with a thirty mile side wind, such as they have in the Windy City, 99-469 and 90-570, thus obtaining the excellent totals of 209-989 for the double York and 179-1169 for the double American.

For the national tournament at Boston, Will Thompson came on from Seattle, apparently to bring a protégé in whom he had great faith, Dr. J. W. Doughty. It was the only time I ever met the kindly old gentleman and I am glad the treat was permitted me. While he was teaching Doughty in the previous April, he reported a score for the single York round, which I am willing to wager has never been surpassed by one of his years: 50-224, 41-219, 22-110: 113-553. Doughty's best was 123-635.

Everybody liked Doughty, born in Maine of the old stock, modest, capable and trustworthy. He had been trained at the York round only, to prove Thompson's pet theory that he who masters 100 yards has all other ranges in hand. The day before the tournament I saw him shoot the thirty arrows at forty yards for the first time in his life. He made well over 200 and about thirteen of the hits were golds. By the point system he won the York Round Championship, although in gross score he was second with 178-802 to Phil Bryant's 176-832. Unfair as that method of computation undoubtedly was, it lasted one year more because of Thompson's vigorous defense of it at the business meeting.

The result of the American round did not bear out Thomp-

son's theory. So many little contingencies arise that can be met only through experience that Dr. Doughty took seventh place. The best feature of the tournament was Mrs. Bryant's record-making flight shot of 251 yards and four-tenths foot.

The Wayne Archers were awarded the honor of conducting the 1914 tournament, thereby tapping new territory. It was held at the Merion Cricket Club at Haverford on the cricket field immediately in front of the handsome club house, a setting of rare charm. Here was revived the old English title of Lady Paramount, which had been used in some of the earliest American meetings but had lain dormant for many years. Dorothy Smith, a child of eleven, took her first steps on the path of fame by winning both rounds in a junior section, which we had experimentally introduced, her double National being 40-162 and her double Columbia 85-395.

After three tournaments in the East it seemed only fair that the one in 1915 should be in Chicago. This meeting was handicapped by execrable weather. A wet, chilling wind, such as is only too common in Chicago, swept in continually from the lake and on the last day there suddenly descended a deluge as though the flood gates of heaven had burst. In a few minutes the field was ankle deep with water, making it necessary to strike several events from the program.

In spite of the bad conditions Miss Wesson broke the records for the single and double Columbia rounds. She was shooting in such wonderful form that with better weather the records for the National rounds would probably have been broken too. Miss Wesson also followed the precedent set by Mrs. Howell, years before, of shooting on a men's team. In this connection it is well to remind ourselves that the constitution of the N. A. A. expressly provides that a woman may take part in any of the events for men but that a man may never take part in the events for women.

In archery there is no line between professionals and amateurs, so the members of the N. A. A. were able to express

their unanimous choice by electing James Duff to be president for 1916, when the tournament was held in his home town of Jersey City. The Scottish-American Archers and the Clan McLeod took the big event under their canny guidance with a result that was a delight to us all. The range was laid out in Hudson County Park, which is now on the Lincoln Highway and the shooting was above the ordinary.

One of those who passed 500 in the single American was Duff, but early in the season that minimum of the expert had not been so easy to reach. These lines of his ring very true to the archer's ear.

#### THE ELUSIVE FIVE HUNDRED

I had been cogitating in my mind, and contemplating,  
As I hied me from the target as before,  
And I often paused and wondered, if perchance I had not  
blundered

While adding up the total of my score.  
My form seemed good as any, and of golds I had so many,  
That five hundred seemed at last to come my way;  
But, alas for that conclusion, 'twas another great delusion,  
So I'll have to try again another day.

With weather quite perfection, not a breeze to cause deflection,  
Though nature seemed in error just the same;  
On her mantle, verdant green, not a daisy could be seen,  
Nor distinctive blade to mark the point of aim;  
Yet with arm as true as steel, and that intuitive feel  
That loves to guide the arrow on its way;  
I tried to make conclusive that mighty score elusive,  
But—I'll have to try again another day.

When I watch with great delight, arrows dropping from the  
white,  
Dame Fortune to my bosom I enfold,  
But,—with leaden feet comes stealing quite a different sort of  
feeling  
· When I see the arrows bounding from the gold;

Still, imbued with great ambition, like the hero of tradition

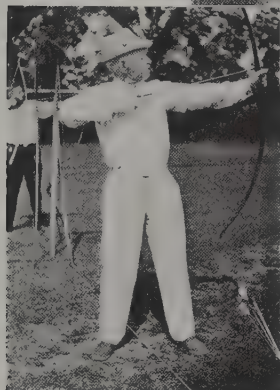
Who exclaimed, "Where there's a will there is a way,"  
I'll keep the arrows flying, every day will see me trying,  
For I mean to have that score another day.

To protect the ladies from the glare of the sun, which in many cases burns their skin to a distressing degree, the park commissioner provided a long awning which reminded one of the pavilion of the United Bowmen of Philadelphia. It added wonderfully to their comfort.

At this tournament Samuel G. McMeen appeared for the first time and won the wooden spoon. He was a native of Crawfordsville, Indiana, and had so often seen the Thompsons shoot there when he was a boy, that he had ever since cherished a wish to become an archer. Starting with that meeting to learn as much as he could he became possessed of the highest skill, at one time making eleven American rounds of more than six hundred, in succession. He is one of the greatest authorities in the world on the telephone and in pursuit of his new hobby he equipped a private wood-working shop, or laboratory, to find whether, in the making of bows and arrows, the exact methods of modern science could add much to the empirical ways of the past. Most of the ideas for the successful mechanical manufacture of equipment which are used by modern bowyers and fletchers originated with him. He also published *American Archery* at his own expense and turned every cent of the profits over to the treasury of the N. A. A.

At the closing banquet of this enjoyable tournament about forty braw Scots appeared in full Highland costume, their bows and arrows replaced by dirk and skean-dhu. Good-fellowship reigned supreme until the piper had squeezed the last tune through his chanter and the whole assembly, with arms crossed and hands clasped, had fervently sung "Auld Lang Syne."

In April, 1917, the United States entered the Great War.



## OLD MASTERS

RENDTORFF  
1914

H. S. TAYLOR  
1925

G. P. BRYANT  
1913

JILES  
1925

McMEEN  
1925

RICHARDSON  
1919

PALMER  
1925

W. THOMPSON  
1913





My wife had foretold the exact month about two years before by the Ouija board. It put a complete stop to organized archery. The tournament for that year was to have been held on Soldiers' Field, in Boston, but that was being used for troops. Most of the archers were busy with some of the activities connected with the war, yet many of them shot from time to time for personal relaxation.

In 1919 it was decided to have a tournament again. A great trouble at first was the complete absence of tackle. None had been imported from Germany, of course, where the toy stuff used to come from, very little, if any, had been sent over from England, and Duff, who was our only good fletcher on this side of the ocean, had been working hard in a shipyard. A formal request was even sent around to all archers asking them to let the secretary of the N. A. A. have any spare tackle for second-hand sale to those who had none.

It was a good tournament, fully up to pre-war standard, and made especially agreeable by the pleasure of renewing former friendships. It was held on Soldiers' Field, from which all signs of military use had been eradicated.

In 1920 the Wayne Archers were the hosts. We shot on a football field which lay east and west, so that while we could shoot both American rounds across the field toward the north the York had to be shot in one direction in the morning and the other in the afternoon, involving a change of targets at lunch time. I mention this to show that a small field need not deter anyone from staging a full-sized tournament.

At this meeting a pleasant social feature was introduced for the first time by having a reception following the afternoon's shooting, or rather a tea, to which many guests who were not archers were invited.

In 1921 the familiar field at Boston was once more the range. The contest for first place was so close that a difference of a single arrow would have settled it; 2,160 to 2,158 by the current system of adding together both double rounds.

The winner had a rebound from the red, which lost him two points, and the loser had a pass through the red, with the same result. If the latter arrow had stayed where it hit the score would have been a tie, although the championship would have been awarded to the same man, Mr. Jiles, because such a tie is decided by the better score in the York round.

This meeting owed much to the presence of Dr. Pope, who had come all the way from California to take part in it. In 1915 he had paid a visit to Wayne, when we had a fine time together.

At Boston he did his "Hiawatha" shooting before the movie camera and easily kept seven arrows in the air at once. While watching him I was convinced that it would be quite possible for him to make it eight. He used special arrows with wide V-shaped nocks, held six of them ready in the bow-hand, used a Sioux Indian draw with the four fingers and thumb on one side of the string and pulled the arrows down rapidly, one after the other.

You remember the words of Longfellow:

" Strong of arm was Hiawatha ;  
He could shoot ten arrows upward,  
Shoot them with such strength and swiftness,  
That the tenth had left the bowstring  
Ere the first to earth had fallen."

(*Hiawatha and Mudjekeewis*. Lines 11-15.)

To show what a difficult feat it is I may quote Will Thompson's words that " No man ever has, ever will, or now can, keep four in the air at one time " ; but Thompson never thought of holding the arrows in the bow-hand ready to draw.

At a charming garden party, given by President and Mrs. Shepherdson in their beautiful grounds which slope down to a lake, Pope gave an intensely interesting lecture on Ishi, his Yana Indian archery companion of neolithic culture, and on his different hunting trips, illustrated by stereopticon pictures reflected on the white side of the house.



# NOVELTY TARGETS

IMAGE FOR WILLIAM TELL SHOOT, 1920

"RUDY" AND "JIM"



The tournament of 1922 stands out in our memories especially vividly because it was held in Cooperstown, New York, where James Fenimore Cooper lived and where the scenes of the Pioneer and the Deerslayer were laid, a beautiful village beside the exquisitely lovely "Glimmerglass," or Otsego Lake. Some of the families who live there are enormously wealthy and we were delightfully entertained socially. I might say as a warning to the aspiring archer that it requires a stronger nerve than most people possess to shoot well enough to win in the day and to do much in a social way in the evening. Personally I am exhausted after the rounds are over and I find it necessary to get all the sleep I can and to eat the simplest food if I hope to do my best.

In this year the Wand Shoot and Clout Shoot were contested for the first time. Douglas Fairbanks had just brought out his magnificent photoplay of Robin Hood, and had given the National Archery Association a handsome vase which we called the Robin Hood Cup and decided to shoot for as Robin shot in *Ivanhoe*, at a wand at one hundred yards. At that time, and for the next two tournaments, the wand was represented by a two-inch strip of paper glued down the centre of a target but in 1925 it was a real wooden stick, two inches wide and six feet above ground.

Since 1913 the ladies had shot at the wand, at various distances up to sixty yards, but this was the first thing of the sort for the men.

The Clout Shoot, as described on page 400, took the place on the program assigned to a Novelty Shoot. These piquant desserts to the more solid fare started at Jersey City by shooting at a silhouette of a duck. Two or three times we played William Tell with an image of my daughter, made by laying her on a board, cutting out the outline, padding it with old tires and dressing it in her clothes. It carried a distinct suggestion of murder.

In 1923 the tournament was held at Chicago. It was the

first that I was unable to attend since 1911. W. H. Palmer, Jr., won it by an excellent score after a neck and neck contest with that old war-horse Jiles.

The next year we were at Deerfield, truly a Dear-field to most from the happy times there in the Eastern meetings. Calling the tournament of 1922 after Robin Hood, though it might more aptly have been named after Leatherstocking, seemed to have set a precedent, for the Chicago match was called the Marquette Tournament and this one was known as the Mohawk Tournament, because the Mohawk trail runs near. The Indian side was stressed for the fun of it. Each archer wore a bright feather in his hat, or hair, though Dallin says that Indian women never wore feathers, and some of the Bostonians not only had an Indian tepee pitched on the grounds but were dressed in real Indian costumes.

Speaking of tents my family tried the experiment of making a camping trip of it and found it to be an ideal way of living at a thing of this sort.

Jiles won the championship for the second time, by a decisive score, but the only individual record established was the team round of 585 by Lagai. Just as he was starting "Rudy" said, "Well, here goes for 600," and he nearly made it.

Both the Rome and Keystone teams broke the previous record in a sensationally close match, the former making 331-1711 and the latter just nosing them out with 333-1727. Here, too, all former flight records were broken.

To digress for a moment from a strict recital of events I would like to say that nearly every serious-minded archer whom I have known has found it of great assistance, and perhaps inspiration, to be able to compare his scores with *all* of those made at a national tournament. As a rule the books on archery contain only the scores of the winners, or record breakers, and the poor tyro is flabbergasted when he compares his feeble attempts with theirs. On the other hand it is a great comfort to look at the bottom of the list and say, "Why,



there is a man who has the nerve to shoot in a great tournament and yet he can do no better than I." To check off one man after another as one's scores improve is as good as beating a personal opponent. For example, in the tournament of 1925, Dr. Crouch made new records for both the single and double Americans with 90-626 and 179-1207, and yet the lowest score for a single American was only 15-59.

This tournament, the largest since 1883, was held on the grounds of the Teugega Golf Club of Rome, N. Y. Under the remarkable leadership of Mr. Knight it proved to be one of the best.

About that time archery was firmly implanted in southern California and sprang into a vigorous growth that soon bore the inevitable fruit of formal matches. One of the earliest was a contest in Los Angeles, at the American round, between four-men teams of Americans and Japanese; our countrymen winning by insignificant scores. None of us suspected that in that winterless land of dust there were soon to develop the superb archers who now stand in the front rank of all who have ever handled the bow.

The year of 1926 was the sesqui-centennial of the Declaration of Independence and was celebrated in Philadelphia by a world's fair, a fizzle of political chicanery, whose best feature was its program of sports. Archery was given adequate importance and was generously provided for by renting the field of the Bryn Mawr Polo Club, on the Main Line, for the holding of a tournament. The N. A. A. took advantage of the opportunity to be relieved of expense by coalescing its meeting with that of the "Sesqui," by which all things were provided, thus enabling its finances for the first time to be raised to a plane of unharried serenity.

Nine days before the match opened, Stanley Spencer, a big game hunter of powerful physique, and "Chief" Will Compton had left California by automobile, crossing the four thousand miles in time to be on hand when the whistle blew.

Compton was always a focus of attention even though he did not shoot. He was a survivor of the old frontiersmen who had lived through the wild days that are so dear to the movies. The Sioux Indians had taught him their archery and from boyhood he had hunted all the wild animals of the west with both gun and bow. Spencer who, after Doughty, came as the second invader from the Pacific slope to upset the tranquillity of the east, proved to be a really great archer. He finally won the championship by a small margin, although Dr. Crouch beat him in the York round and General Thord-Gray, shooting in his first tournament and excelling his own best practice score, pushed hard against them both in third place.

As dusk was ending the final day a veteran shot his last long shoot. Phil Bryant, a Sesqui entrant, sped but one shaft and yet he realized a life's ambition by bettering Maxson's flight record; reaching 299 yards and 2 inches. He never competed in another match.

It was at this meeting that President Palmer introduced the grouping of targets into sets of threes, as now prescribed in the by-laws.

The greatest feat of indoor shooting that has ever been recorded took place on January 24th, 1927. Whilst presiding at a holiday banquet of the 9th Coast Artillery Regiment of New York, General Thord-Gray had been twitted on his interest in the bow. With dauntless spirit he instantly dared the organization to set their twenty-four best revolver shots against him in a match within the armory at eighty yards. They accepted the challenge but on the evening of the match they "crawled," as we used to say in college. Instead of two dozen, which would have meant a lower average of merit, only the twelve best marksmen in the regiment appeared and even they insisted on shooting alone in silence, in a gallery shut off by glass, and at only seventy-five yards. The general was obliged to shoot at eighty yards in the midst of a surging crowd of more than a thousand spectators who violated

every rule of ethics and etiquette by pushing him, calling to him and getting in his way. Luckily he is descended from Viking stock and he went berserk. On a twenty-six inch pistol target, pinned to a straw bass, he made 70 hits out of 72 arrows with a score of 508 which, being doubled to equal the number of revolver shots, gave him 1016. The revolver experts scored only 979. On an archery target the count would have been at least 70-630. For comparison, Ford's best St. Leonard's round of 75 arrows at 60 yards was 75-555 and Rendtorff's best 96 at 80 was 96-568, both being made in the placidity of private practice. Nothing else to approach General Thord-Gray's performance has ever been known.

The N. A. A. tournament at Boston, high mark of the rising tide of archery, for the first time exceeded in numbers that of 1879. Crouch was the victor, dogged by Brush and Lambert who were only two points apart. Spencer, seemingly out of form, rated fifth. The meet will always have a place in my heart for it was the last time that I won a major event in a national tournament, the double American round. After that the pace was too hot.

During the years from 1926 to 1932 so many new records were continually being made that it is impossible to give them space. More archers, longer shots and bigger scores by men, women and children! Later in the book I will tabulate the marks as they finally stand when this manuscript goes to press, knowing full well that they exist only to be broken.

In 1928 we shot at Rye, N. Y., on the polo field of the Westchester-Biltmore Country Club; General Thord-Gray directing with military efficiency.

It stirred one's blood to see the shooting. Dr. E. K. Roberts of Ventura, California, skillful, modest, with the scarcely audible voice peculiar to the dental profession, was generally picked to win. Andy Brush was in top form from his daily teaching. Bill Palmer was steady as a machine. The field was filled with experts.

Palmer won the first York by a wide margin and would have had the tournament well in hand but for an unfortunate circumstance. All the men's targets were placed in front of trees or buildings except the first one, which had absolutely no background at all. As the highest three men in the first York would be put there for the second round, I had protested strongly but ineffectually on the day before the tournament, pointing out the injustice of forcing such a terrific handicap on the very archers whose merit should entitle them to the best, not the worst. One shift to the right would have evened everything. Bill was a sick man and had to use a feeble bow so that in the second one hundred yards, where he vainly combed the azure deep, nine men who either shot in heavier bows or had points of aim drew ahead of him. Once he made only two hits with eighteen arrows. Yet such were his pluck and skill that though he lost the double York to Andy and was almost prostrated with exhaustion, he pulled out at the short ranges, won the American and took the championship. It was a marvellous exhibition of pure nerve. Roberts was second in the final standing. About thirty per cent of the men made over 500 in a single American round. Palmer was not physically able to shoot again until the summer of 1932. Then, with his uncanny powers of concentration, and with less than fifty practice arrows spread over a couple of days, he set himself to shoot a double American in earnest, his first in four years, but registered only the paltry nihility of 90-596:  $90-614=180-1210$ . The next Sunday he won the championship of the Philadelphia A. A., in a fine tournament, with a double American of 1199. I said: "Missed twelve hundred; too bad!" He answered: "No; won bad!"

In November, 1928, when shooting had begun to hibernate in most of its haunts, a bit of cheery news came from the annual championship tournament of the Santa Monica Archers. Clinton W. Douglas, of Los Angeles, a school

teacher of light physique, had finally passed the goal toward which all archers had striven for seventy-one years, and had beaten the double York record of 245-1251 made by Horace A. Ford. He not only bettered it but he actually raised it into a new century with 255-1309. It is the only time, as this is written, that 1300 has been reached in a public match under N. A. A. sanction and it rates as a true record. In range detail:

55-207	47-271	24-148	126-626	
62-272	43-239	24-172	129-683	255-1309

The performances of the archers of southern California in 1929 staggered belief. The average was so high that one cannot speak of the leaders without doing injustice to the noble many who pressed close behind.

In June, the annual championship tournament of the Southern California Archery Association found everyone in top feather. Spencer won the double York with 1230 and we began to get used to such figures. The next four men, led by "Dusty" Roberts, made from 1136 to 1177; and to think that for seventeen years we thought Richardson's 1111 was almost unbeatable! At the American round we could only gasp when Roberts made a new world's record, for this match also was sanctioned by the N. A. A., of 96-666, 90-674: 180-1340. It was real suspense from then till the national in late July.

By every rule of righteousness the N. A. A. tournament should have been held in California, and so it was. A line of targets spread for five hundred yards down the great Hope Ranch polo field at Santa Monica, high mountains behind them, the atmosphere clear as crystal and not a movement of air that might even simulate wind. The battle was royal but victory was decisive and when Dr. Roberts had shot his last arrow he was mounted on a shouldered target and borne in triumph. Why not? He had broken Ford's score in our



national meeting, making 257-1293, and had followed it with a double American of 180-1308.

How I wish there were space to tell something of the many other matches that dotted the country! Enough is suggested when I say that the N. A. A. listed one hundred and forty-seven clubs without counting those of colleges, schools, summer camps and boy scouts. The lowest estimate that I obtained from professional fletchers of the total number of archers in America was one hundred and fifty thousand.

The fiftieth or jubilee tournament of the N. A. A. was fittingly placed as near as possible to the site of the first one of 1879 on the lake front of Chicago. Homer Taylor was the only archer who was present at both. Fortunately for the drooping spirits of us meek archers of the effete east, a new champion arose from our midst in young Russell Hoogerhyde, tall, sinewy, blond and serene. It was his first national tournament and only his second year of shooting, yet he not only won the match but incidentally made a new N. A. A. record of 89-673 for a single American. In fact, two other easterners, Robert Jackson—1260 and Carl Thompson—1226, beat the California trio, Mould—1220, Douglas—1189 and Styles—1153 in the double American, though the latter were second, third and fourth in the championship standing.

In compliance with a vote taken at Santa Monica, this tournament inaugurated the system of computing results on the basis of scores only. Henceforth hits had no value, although they were still recorded for purposes of comparison.

In 1931, high standards were maintained in the far west, Dr. Roberts making 1301 in a double American and others doing nearly as well. In the mid-west and east there was a noticeable improvement, led by Hoogerhyde; many matches reporting scores in the twelve hundreds for both major rounds.

The N. A. A. tournament was at the colonial, elm-shaded town of Canandaigua in northern New York, the home of President Carl Thompson. The field of a hundred targets



was laid out in a golf course beside the beautiful lake of that mellifluent Indian name and the archers lived in cottages by the water's edge or in village hotels. A great gaudy umbrella shaded each target group and a row of marquees in the rear, as had also been at Chicago, afforded every convenience.

Hoogerhyde was again invincible. To be sure, his double York of 1133 could not be classed with Roberts' great record, but in the double American he beat that little giant by three points, pushing the mark up to the still dizzier height of 179-1343. Such scores are like beacons, shining for us who toil up the slopes below. The first single was a marvellous record by itself; with the second it is detailed:

30-222	30-222	30-254	90-698	
29-181	30-220	30-244	89-645	179-1343

In the first forty yards, "Russ" made twenty-four golds, sixteen of them in succession, with three perfect ends.

Francois Xavier Goulet, tireless, accurate and of Gallic affability, was the lone emissary from southern California. He shot splendidly, ending only four points behind Andy Brush in third place.

In 1932, at Seattle, Hoogerhyde made new single and double York records of 126-696 and 244-1296, paving the way for the 700 and 1300 that will surely come in time. Though he did not surpass his wonderful single American of 698, he raised the double American record to 180-1380, the first forty yards of 258 being only twelve points below the possible, or impossible, 270.

Yet fully as great a triumph, to my mind, was the incredible achievement of Ralph H. Miller, of Seattle, a boy of only sixteen who had been shooting for scarcely a year. He not only beat Hoogerhyde in the first York by 121-605 to 118-600, but, by shooting 56-252 in the hundred of the second to his opponent's 54-256, actually began the second eighty with a lead of one point. I have a special feeling of

pride in this marvellous lad, as he was born on December 12, 1915, in my home town of Wayne, Pennsylvania.

Though it may have seemed that the gentler sex has been too slightly noticed in the preceding pages, I may say that the omission has been intentional. In spite of the splendid work of the men, the tournament of 1931 may fairly be said to have been distinguished by the shooting of the women, and I feel that their story may be more coherent if gathered together in this appropriate place.

For twenty-four of the early years, 1883 to 1907, Lyda Scott Howell (Mrs. M. C. Howell by her husband's initials), with seventeen championships, ruled in almost unbroken sway. The only woman who beat her, except a Mrs. J. Arthur who took second place in 1887 when Mrs. Howell was third, was Mrs. Phillips, the champion in the last three years of the '80's. In the other four scattered years she did not compete.

The next really great bowwoman was Cynthia M. Wesson, at that time teaching in Bryn Mawr College, who won three championships. After her came Dorothy D. Smith.

Dorothy was born in 1903 at Newton Centre, Mass., and was nine years old when she began to shoot there, on the municipal range, with her father Louis C. Smith. In 1913, when ten years of age, she competed in her first national tournament, shooting with the ladies, and won the Beach Trophy for girls under eighteen by defeating two other eligible contestants. In 1914 she won the junior section, which was introduced for the first time. She did not shoot again until 1919 when, as a slim little lass of sixteen, she became the youngest national champion ever to hold title in either America or England. From '21 to '26 she won five tournaments, missing only '23 when she was not present. In 1919 Miss Wesson was not entered and in 1920, when Miss Wesson won, Dorothy did not compete. In 1922 Dorothy beat Miss Wesson. On June 27th, 1927, she was



DOROTHY SMITH CUMMINGS

NOCKING  
AIMING

DRAWING  
AFTER LOOSING



married to H. S. C. Cummings of Brookline, Mass., and straightway went on her honeymoon to England, where she attended the Grand National as a spectator but had no equipment with which to shoot. Returning in August just in time for the N. A. A. tournament, she entered with virtually no practice but, under the stress of competing with that splendid archer Mrs. Robert Johnson of Los Angeles, took second place with the highest score she had ever made in competition. She has the champions' complex of rising to the need of an occasion.

The next three meetings also went to Californians, Stanley Spencer's sister, Mrs. Hodgson, wearing the diadem in 1928 and Mrs. Audrey Grubbs in 1929 and 1930.

Mrs. Cummings, who had not competed since her defeat by Mrs. Johnson, returned to the range in 1931, the mother of two children. In the meantime Dorothy Duggan, a sixteen-year-old schoolgirl of Greenwich, Ct., who had been taught from the start by Brush, had attracted the attention of the archery world by winning the tournament of the Eastern A. A. in 1930 and taking third place in the national meeting. In the Eastern of 1931, in June, she had stood second to Mrs. Cummings. With the quick improvement of youth she showed herself a worthy rival at Canandaigua and the fight between the two Dorothys was epochal.

Dorothy Cummings set a terrific pace with a single National of 70-426, which replaced the record of 68-398 made by Mrs. Howell in 1895, and broke it again in the second round with 421; the double of 139-847 smashing Mrs. Howell's 132-756 to bits. This also broke the record of the Grand National of England, 143-841, made by Miss Legh at Great Malvern in 1905, though it was still well below the best English record of 72-480, 71-401: 143-881 by Miss Legh in 1905 at the Leamington and Midland Counties Meeting. Dorothy Duggan's 140-786 also broke the American record and would have won all of the fifty previous tournaments.

With sixty-one points to make up, Miss Duggan spurred herself to new effort and began the Columbia with a superb single of 72-530 which cracked wide open the old record of 72-510 made by Miss Wesson in 1915. It was composed of twenty-four golds, thirty-nine reds, seven blues and two blacks. Nothing daunted, Mrs. Cummings broke it too, with a beautiful 517. Miss Duggan was given an ovation when she got a second of 72-516, making a double of 144-1046 and beating Miss Wesson's old mark of 144-998, but Mrs. Cummings' 72-490 was still good enough to win and for the seventh time she was proclaimed the champion woman archer of the United States.

At the annual championship tournament of the Connecticut State Archery Association on November second, under N. A. A. sanction, Dorothy Duggan broke both records for the single rounds of the National and Columbia with 71-455 and 72-536, stamping her as one of the greatest archers of all time.

Every man knows that his business or profession cannot survive unless it be constantly replenished with new clients, and archery is no exception. For that reason, when I was president in 1914, I introduced a juvenile section in the N. A. A. tournament, and Dorothy Smith proved its worth. But the idea did not win favor. For nine years more, such children as entered were obliged to pay full adult fees and to shoot with their elders. It was a touching sight to see the plucky little boys straining their puny bows at an elevation of forty-five degrees in a hopeless attempt to reach the hundred yard target. As chairman of the Sesqui part of the tournament of 1926 I determined to try again and so I invented the junior American round for the boys. It was won by Donald Mackenzie, aged 15, who lived opposite General Thord-Gray, the double being 164-956. Again the plan was vindicated, as Donald has become a great expert, winning fifth place among the men in the tournament of 1931. Since then the junior



division has always been recognized and is now ordained in the by-laws, the age limit being the sixteenth birthday. Astonishingly good scores have been turned in, showing serious effort. Beginning in 1928 an intermediate division, from sixteen to eighteen, has been optionally introduced. To my mind this incorporation of youth is one of the healthiest features of American archery. However, the records of the intermediate class are perhaps the least valuable of any, because such truly great archers as Ralph Miller and Dorothy Duggan have disdained to shoot in it, although they were eligible to do so.

Indoor archery has become widely practiced during the severe winters of our northern states. Some buildings of great floor space, such as armories, convention halls and athletic pavilions, allow shooting at the full standard ranges for outdoor rounds; usually the American, occasionally the Hereford and rarely the York. Of course dirt floors are ideal, but wooden flooring can be made innocuous by spreading coarse matting in front of the targets and hanging it up as a curtain behind. One of the best materials is cocoa matting, used for heavy baling, as the holes in it will close better than in felt, which is often used.

The first time that shooting at one hundred yards was done under a roof, in America, was on Saint Patrick's Day in 1928, in the athletic pavilion of the University of Washington. The Pacific Northwest A. A., at a regular tournament with fifty-two contestants, shot the Metropolitan round for men and a Columbia for the ladies, seventeen-year-old Hans Grage winning the former and fifteen-year-old Patsy (auspicious name!) Duryee, the latter.

Naturally, the great majority of indoor ranges are not much more than one hundred feet in length. For all such places it is best to pack the whole end with baled straw, on which target faces can be pinned where desired. The Penn A. C., of Philadelphia, has utilized an unfinished wing on a high floor

by making it into an attractive forty yard range. In buildings of that sort the available distance is often modified by the comparative lowness of the ceiling. One of my friends, Edmund R. Teubner, Jr., whose house in the ancient village of Horsham, Pa., was built in 1707, solved the problem of what to do with an enormous barn, in this motorized age, by making it into a winter archery range. All through the wild weather it is full of merry week-end guests.

In my opinion it is best to do most of the shooting at the maximum distance that is allowed by the room. Many archers, however, prefer a so-called Indoor American round, where everything is reduced to one-third of the standard size, the distances being 60, 50 and 40 feet and the target sixteen inches across. Enormous scores can be made at it, and to say that it reproduces the difficulty of the standard outdoor round, because of the small size of the target, is not true. Nevertheless, it is a pleasant sport for a winter's evening. If a room of sufficient size be not available it can often be carried out in a long hallway. Unquestionably, the standard target is too big for a hundred foot range unless it be needed for a backstop as well. The Olympic size of two feet is very satisfactory, or the sixteen inch is even more exacting for experts.

Evidence of what can be accomplished at short work was given at Tonawanda, New York, on April 19th, 1932, by Frank Horack, a powerful Austro-American, who had won the championship of the state of New York in the year before, the first of his shooting. This indoor match, against the crack pistol shot of the Twin City Rifle Club, Sergeant Herbert Wolf, was at fifty feet, the target being the regulation pistol target for that range, only 8.75 inches in diameter. Horack's score was 127 as against 124 for Wolf. It may be said here of Horack that in the championship tournament mentioned above, in which I shot on the target with him, one of his Americans was 90-658, and that in a club match on December 27th, in an American of 90-682, he shot a 40 yard



INDOOR RANGE AT WHITE SULPHUR SPRINGS



COMMERCIAL RANGE AT PHILADELPHIA



score of 260, composed of twenty-five golds, at least seventeen being in succession, and five reds, the best I know of.

Commercial archery ranges have become very common, especially at amusement parks, and have proved to be good financial investments for their backers. They also have a distinct advertising value, permanently interesting many who come to scoff but remain to play. The ultimate success of such ventures is definitely in proportion to the patience, intelligence and skill of those who are in charge. If the novice be left to himself to bruise his arm, skin his fingers, hit the ceiling and bear the jibes of his companions, the place will surely die. Instruction in correct shooting must be given carefully and to all. Full sized targets should be provided, with a small one for the more proficient, and a few cotton animals and rubber balloons may be set up for hunters, though that sort of thing seldom creates the sustained interest that increasing scoring will do.

Commercial ranges should always be short. People want amusement, not disappointment, and so the targets must be near enough to be often hit by those who are handling a bow for the first time.

## IV

### COLLEGE ARCHERY

A DEVELOPMENT of this century which will have a tremendous influence on the future of archery is the strong hold it has taken in women's colleges.

It is wonderfully adapted for them. As a prominent educator said to me, "Girls have hockey in the fall, as against football for the men, but they have nothing in the spring to equal baseball."

If I may speak from the professional standpoint of a physician I will say that there is no form of exercise better suited to women. It strengthens every muscle of the body without danger of any of the injuries which are only too often accidental to other sports.

If a college introduce archery and expect it to be more than an ephemeral fad it must be given dignified recognition among major sports, done with proper equipment, under rigid discipline and taught by competent instructors, who will also be able and willing to keep the tackle in repair.

If the targets be small, cheap ones that even an expert could not hit, if there be ten times as many archers as bows, if the arrows have no piles, if there be no finger-tips or bracers and the girls merely punctuate a half-hour's conversation with a few random shots, then archery at that school is doomed.

As similar problems arise at most colleges and schools, I believe the best way for me to help those who intend to be instructors in archery is to tell of my experiences in establishing the sport at Bryn Mawr College and the Valley Forge Military Academy of Wayne.

Miss Cynthia Wesson had been an instructor in athletics at Bryn Mawr before the war, during the time she was making





# VALLEY FORGE MILITARY ACADEMY CADETS

KAZMAIER

FAWCETT

DUFFY

ELMER



her wonderful world's records. Whether because prophetesses, as well as prophets, are not without honor save in their own country, or whether, as I believe, it was impossible for anyone to do much to interest individuals in archery until a general knowledge of it had been spread through the land, she was not able to make the girls show sufficient interest to force the college authorities to classify it among the major sports. However there were left from those days three fair bows, needing strings and a tip or two, and a very few arrows in various stages of decrepitude. With this wholly inadequate tackle a handful of enthusiastic young ladies, who by the grace of Heaven were naturally endowed with the qualities of leadership, began to shoot on the opening of college in the fall of 1924.

When I was asked to assist them I immediately took up the question of targets, the rock on which most young societies founder. Time and money being short, we decided not to attempt to secure standard targets, which are always expensive, are soon shot to pieces and in those days were slow of delivery. Instead, I introduced for the first time the butt made of three or four superimposed bales of straw, a device which I had originated for my own use. It is cheap, easily procurable and much more durable than a sewn bass. Since then it has become widely known.

We marked off the ranges, from thirty to sixty yards, at first with brightly painted wooden markers, which is a good way on an ordinary lawn, but later with regular chalk lines when the field was definitely set apart for archery. Three more butts, making one for the members of each college class, were added as the archers increased in number.

The problem of tackle solved itself. Girls who could afford it purchased full sets for themselves and no one regretted the expenditure. It is the best way when possible. For general use the college bought several dozen dowel arrows, which was all the exchequer could stand. However, I believe that it is

good to use cheap arrows when learning the rudiments of archery and to reserve some funds until the students can use arrows as experts do. Then buy the best and the scores will jump upward in a way that will gladden the heart, for with poor arrows no team can ever hope to win.

From long established custom, arrows are usually sold in dozens but I believe that it is much better to furnish them in sets of eight for institutional use. It is gratifying to observe that some fletchers are now of the same opinion. On the range, a dozen arrows are divided between two archers into sets of six, which not only are confusing because they have the same crest but are rendered useless, or at least inconvenient, as soon as one arrow is broken. Eight arrows give the required half dozen and a couple of spares besides, insuring a full set during repairs or replacements. A convenient and thrifty plan is to buy several dozen unpainted arrows and crest them yourself according as a set of eight is depleted.

The teaching of the military cadets ran closely parallel with that of the girls. Both groups were accustomed to discipline. They listened earnestly to instruction and tried hard to follow it, in marked contrast to the average person who has not learned such self-control.

While extramural contests should be arranged chiefly with institutions of the same sort, and championships decided on that basis, I have found it well to spice up a season with a few matches between boys and girls, in which the former are by no means always victorious.

Mail matches between colleges for girls have been held for perhaps a dozen years, the earliest records being rather difficult to find, but for several seasons past the N. A. A. has officially sponsored them under the title of The Annual Intercollegiate Archery Tournament. The rules specify that eight girls shall constitute a team, the single Columbia shall be shot on any convenient day within a given week and the results shall be sent to the secretary of the N. A. A. for



# BRYN MAWR COLLEGE

PAMELA KINCAID, WINNER OF WREATH-SHOOT, 1926

ROBIN HOOD'S MEN, PAGEANT 1922

TEACHING GIRL SCOUTS, 1926





tabulation. In this spring of 1932, five hundred and sixty girls took part in seventy-one teams representing sixty colleges. The University of California won with the splendid score of 544-3086, an average per girl of 68-386, the best, both for that team and the whole tournament, being Betty Gene Hunt with 72-462.

#### ARCHERY FOR CHILDREN

A few years ago a lady who was writing a book on outdoor games for little children asked me to furnish the chapter on archery. I told her that if I did it would be composed of the single sentence: "Archery is not fit for little children." We must never forget that the arrow is primarily a weapon and only secondarily a toy and that it should be put in the hands of only such children as could be trusted with firearms.

Nearly always, children will shoot at each other, if they be not watched, either playing Indian or pretending to hunt wild animals. I have heard of ten children who were shot in the eye by their playmates' arrows. One shaft was from my own bow. Fortunately it was a small stick tipped with a cartridge shell but I well remember my childish fright when I saw it go straight to the little girl, at whom I certainly aimed it, and hit her in the inner canthus. The daughter of a prominent archer was playing with a little friend when the feather only of an arrow cut across her eye and inflicted a serious wound which resulted in the practical loss of sight on that side.

#### SCOUTS AND SUMMER CAMPS

The proper age to begin archery is twelve, when the boy, or girl, is considered old enough to become a scout. By that time the primitive impulses of childhood are beginning to be modified and it is possible to awaken an appreciation of competitive sport.

The atavistic call to the bow is dominant in every boy.

How could it be otherwise when one considers the close relation it has had to men of all periods? It is absolutely normal for every boy to wish to discharge projectiles at some mark and it is infinitely better that he should do so with a bow than with the far more dangerous gun. There is no comparison in the training afforded by the two in muscular coördination, self-control, poise or physical and mental judgment.

Parents who like to shoot should encourage their children to face the butts beside them and learn to shoot with correct form. If a few of the neighbors' children compete the interest is multiplied. For this purpose the child should be supplied with sharp arrows but for shooting by himself at rovers marks, which is what children will usually do, he should have nothing but blunts.

For the last twenty years there has been more or less attention paid to the bow and arrow among boy scouts but the real father of the great movement for genuine archery among that army of boys is Arthur P. Knight.

In the latter part of 1921 he began to work on the problem of interesting the boys of Rome, New York. Few men would have devoted themselves to the task with the ardor he displayed. Within a few months the boys were making bows, not only at home but under adequate supervision in the manual training departments of the schools. Some of them acquired fair skill in shooting and in 1922 at Cooperstown a team of boy scouts shot for the first time in history in a national tournament. Their rise in skill was miraculous. By the next year Rudolph Lagai was shooting with the best men on the range, at the national tournament at Chicago, and in 1924 he won the Eastern championship, defeating veteran archers who were older than his father.

It is hopeless for a scout-master to attempt to turn out a team of boys, or to expect archery to flourish in his patrol unless he be an archer himself. He must be prepared to give patient instruction, to mend the arrows, bows and strings,



GOING TO THE RANGE  
GREGSON '28 McELWAIN '28



THREE OF THE BUTTS  
MILLICENT PIERCE '26



BRYN MAWR COLLEGE





which few boys have the capacity to do, and to inspire them with enthusiasm.

I approve of buying the first equipment for boys. It is infinitely easier to make a baseball bat than a bow and yet no one tells the boy that he must carve a bat out of a log of firewood before he can play ball. Let him learn to like the game first by making it as pleasant as you can. Do not create a primary disgust by forcing him to attempt feats of craftsmanship which are far beyond his powers.

Later, when his interest is genuinely aroused, set him to work making a bow, which is a much more simple operation than making an arrow. Buy a good stave of lemonwood for him; do not send him off on a search through the woods for a piece of timber which will take a year or two to season. By following the directions on bow making in this book the average scout can make a fair weapon on his third or fourth trial.

Girls should not be expected to work with carpenters' tools and therefore the bows and arrows should be supplied. There are, however, many things which a girl might properly do. She should certainly know how to make a bowstring. To make a shooting glove or set of finger-tips should also come within her province. Ornamented quivers, belts and bow cases are highly suitable.

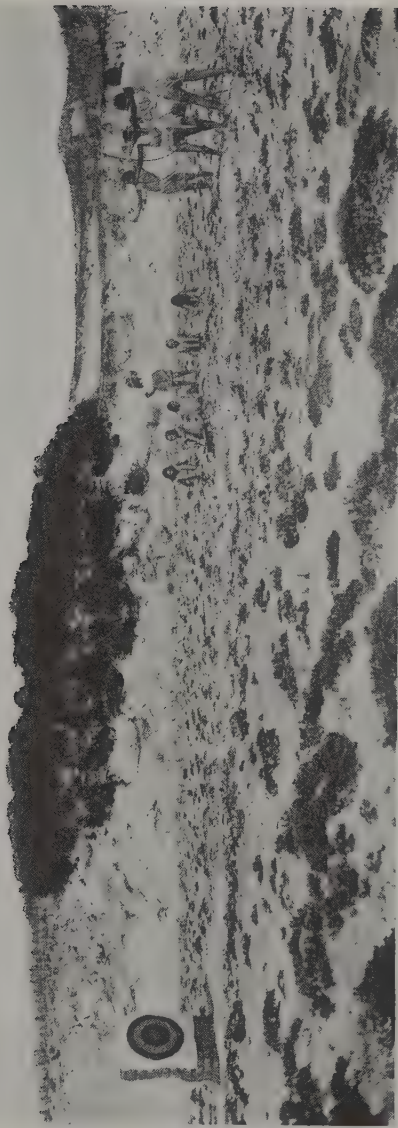
To arouse initial interest one should start with roving. Furthermore, it is the only game possible in very cold weather. Each youngster is allowed only one arrow and is held responsible for finding it after every shot, though several, or even all, may use the same bow. Yet the chief emphasis should be placed on target shooting and roving should not be persisted in to the detriment of practice at the ranges. Aiming at random marks is delightful but it does not develop a real archer.

Camp and scout leaders who turn to this chapter for advice may be disappointed by its brevity and apparent incompleteness. That is because most of the information which they

need is common to all archery and is dealt with elsewhere. The whole book must be studied.

As a parting word let me insist that success in archery with boys and girls is proportionate to the enthusiasm and ability of their leader. Happily, so many adequately trained young men and women are now available as instructors that there is no excuse for carelessness in the teaching of the tens of thousands of youngsters who take up the bow every summer.





*Elizabeth Elmer*

ON A BEACH OF CAPE COD



## V

### LOCAL ASSOCIATIONS

IN the general enthusiasm of the renaissance of archery, in 1879, nearly every village had its club, and it was but natural that they should gather into large associations for promoting mutual competition. The five important ones were:

The Eastern Archery Association, whose history we will follow in detail.

The Western Archery Association, with headquarters in Chicago.

The Pacific Coast Association, centering in San Francisco.

The Ohio State Archery Association. This was the strongest of all. Until 1906 it held tournaments almost yearly and produced some of the best archers America has ever seen, including W. A. Clark, Col. Robert Williams and the almost peerless Mrs. M. C. Howell.

The Potomac Archers, of Washington, while a club in name, were really a nucleus for all the archery clubs in that vicinity. Maxson was their brightest star. If archery were ever popular south of the Potomac River at that time I have no knowledge of the fact.

In the lean years of archery all of these associations died out, or at least became so enfeebled that they did not hold annual meetings, yet in the early times their tournaments were big affairs and should be treated with respect in considering our American records. To my mind, for example, the double York of 220-1042 which Colonel Williams made at the Ohio State tournament in 1883 is entitled to as much credit as the 221-1025 which Palairot, of England, made at the Crystal Palace meeting the year before and which is recorded in all the books. At the same meeting Colonel Williams made a dou-

ble American of 177-1129, which stood unbeaten until Bryant established a national record in 1912.

The Eastern Archery Association suffered the same lapse of vitality that the rest did but it was resurrected a few years before the World War and since then has constantly increased in importance.

It was born at the Parker House, Boston, in the summer of 1879, as a result of a call to all who were interested in archery and in September, at Beacon Park, the first tournament was held with thirty-six men and eight women present, representing nine clubs.

For convenience I will tabulate the names and scores of the winners elsewhere.

The second and third tournaments were also held in Boston. At the former one of the contestants was Mr. A. G. Whitman, who later became a sort of link between those times and ours, as it was due to his unsurpassed fletcherly and to his teaching that archery remained alive in Boston and produced the men there who have done so much for it.

The fourth tournament, in October, 1882, was held in Hoboken, N. J., with sixteen men and five women present, all but four of whom were from the vicinity of New York. Reading the minutes of the meeting, one wonders if there had been a sort of reorganization of the society, as a cryptic sentence says: "It was decided that the medals bought from the old E. A. A. should remain the property of the association."

After this there is a hiatus of eight years which seems destined to remain a blank and I personally believe that there were no contests. For definite facts I must begin at 1891, when a tournament was held in Washington under the guidance of Maxson, to whom belongs the honor of keeping alive a feeble spark of life for a dozen years.

As a matter of fact those meetings were nothing more, as a rule, than formal contests of the Potomac Archers, though occasionally a visitor dropped in. The radical change occurred

in 1903, when a double meeting was held in both Washington and Boston, a sort of mail-match which set a precedent for future years. Wallace Bryant, of Boston, was the winner and thereby came into possession of the two gold medals of the association which eight years later formed a basis for the next competition.

In 1911 the opening of a municipal archery range at Newton Centre had rekindled the enthusiasm of all the archers who lived near Boston and they urged Richardson, who was president of the N. A. A., to assume the like office in the Eastern and to issue a call for a mail-match on November 11th in which the two gold medals were to be shot for once more.

At Newton Centre eight men and seven women competed and the only other entries were seven men of the Wayne Archers, who had begun their corporate existence on September 30th and were eager for their first match.

The tournament in 1912 was also a mail-match, showing the results of a year of active toxophilic propaganda in a much larger entry list.

After these two matches against invisible foemen it was natural that sentiment should demand a real shoulder to shoulder contest and, to open new territory, the site selected was Wayne. Fortunately a great community field day was held on the school athletic field across the street from my home and our comparatively modest show was thus made a part of the big one. You have no idea how much more impressive an archery match seems when there are more than two thousand spectators crowded around the shooters.

In 1914 the tournament was held in Jersey City, on the invitation of that splendid band of men, the Scottish-American Archers. Here the miserable old English point system confused the issue because, while Hertig made only 653 to 722 by Jiles, he had more hits and a slightly better range score at one hundred yards and therefore was the winner.

For the next two years Newton Centre played the host

and then America's entry into the war stopped all formal archery.

In the spring of 1919 shooting was resumed through the medium of a mail-match but it did not meet with popular approval. Many of the archers were of the newer set who knew nothing of the mail-matches of earlier days and they did not feel that it was a sufficiently dignified method of determining the championship. Another cause of discontent, which I am free to acknowledge was quite justifiable because I was to blame for it, was that the ladies were requested to shoot the American round. As one and all refused to do so no championship could be awarded to one of their number.

The next year saw a real tournament once more at Newton Centre at which Homer S. Taylor performed the astonishing feat, for one of his years, of winning with a double American of over a thousand and a double York of nearly eight hundred.

The next two tournaments, the former of which was the first one I had ever attended, were held at Deerfield, a lovely colonial village in the Berkshire Hills of Massachusetts, which was the scene of the massacre of 1704. That dark episode was designed by the French to capture Rev. John Williams, to be used in an exchange of military prisoners, and the Indians played the cat's paw. The house that was built for Williams on his return from captivity is now part of the Deerfield Academy where, through the influence of Homer Taylor, we lodged and shot. As archers are mostly recruited from the professional classes and are of varied attainments, the gathering seemed to resolve itself into a wonderful house party. I happen to have before me a beautiful poem by Mr. Frentz, who was an editor of the *Youth's Companion*, which begins like this:

“ On velvet smooth celestial fields  
I hope some day to stand,  
My quiver full of lightning shafts,  
A rainbow in my hand.



“ Then shall the sun’s great golden disc  
Slow sinking in the west,  
Stir all my old-time archer blood,  
And bid me do my best.”

To tap new territory an invitation from the Scottish-American Archers of Jersey City was accepted for 1923 and the meeting was held in the Hudson County Park on the Lincoln Highway. No tournament will ever remain more vividly in my memory as I took over a team of four Wayne boy scouts, with a friend and my little Bobby, aged eight, in an open “ Suburban ” Ford with no top. It was dark when we arrived and a drizzle was falling, but we managed to pitch a tent and we lay in it like sardines in a box, suffering infernal torments from clouds of mosquitoes. In the morning some were almost unrecognizable. Thereafter we slept on the floor of a house that was used by skaters in the winter. It took me back to a time when my years were less than half as many and I thoroughly enjoyed the petty hardships, even when we seemed to sail the very seas through a cloudburst on our way to a party one evening.

But 1924 was very different, a scene of splendor at the great Westchester-Biltmore Club, of Rye, N. Y. We shot on the velvety polo field, surrounded by a lovely panorama of rolling hills and sparkling sea.

All the rest of the tournaments were held at Deerfield, each year showing an improvement running closely parallel to the upward trend of archery everywhere. The winners and their scores are tabulated in a later chapter but special praise must be given to Dorothy Smith Cummings. She has now performed the astonishing feat of winning every meeting in which she has contested, nine in all. Victory in the E. A. A. has been fully as difficult as in the N. A. A. To win in 1931 she established new American records in both the National and Columbia rounds which, however, were destined to stand for less than two months because of the phenomenal shooting

in the national tournament, when she raised the National to a new world's record and Dorothy Duggan performed with equal brilliancy in the Columbia.

In 1927 Dr. Crouch, for the first time in a recognized tournament, broke Richardson's famous double York record of 1111, made in 1910, with 232-1142.

A humorous incident occurred at the tournament of 1926 when four men, Palmer, Thord-Gray, Neild and Lagai, were found to have tied for a prize that was offered for the most golds at one end, each having made four at forty yards. Though it was eleven o'clock at night with no moon, the men agreed to shoot it off in the glare of auto lights and Palmer won with 6-44 and one gold. They actually wore real clothes but here are a few lines from a poem which show how it looked to Jim Duff:

While the little stars were twinkling in a sky of inky black  
And the glorious sun for hours had been at rest,  
Four brave and stalwart archers on a perfect dewy lawn  
Fought out a bitter fight, pyjama dressed.

The first one in his nighties, or at least all decked in white,  
With tall and slender form stood in the ring  
And scored five reds and one good gold, while for his point of  
aim  
He simply took the night moth on the wing.

Membership in the Eastern A. A. is open to all residents of the United States who live east of the Mississippi River but, in practice, such a large territory has been found to be inconvenient and parts of it have fallen away to be joined to more accessible nuclei. Quite naturally, other regions have felt the need of associations of similar nature, which can focus the activities of their many units. At present our country is covered by four such organizations, the Eastern, Midwestern, Southern and Western Archery Associations. To some extent they overlap, a condition which will doubtless be adjusted in

time, and all of them include many smaller associations of varying nature and outline.

Perhaps it is best to trace the rise of some of these smaller ones in order to understand the composition of the larger.

In the fall of 1925 General Thord-Gray called a conference of the leading archers who lived in the vicinity of New York. As a result, the Metropolitan Archery Association was formed, its membership being open to all who live within fifty miles of the city hall. It has been a strong organization from the first and has developed many excellent archers, chief among whom are probably the general himself and Andrew Luke Brush. The Metropolitan round, which was devised at the original gathering, has proved a valuable contribution to shooting canons.

The Philadelphia Archery Association was founded in the next summer along similar lines, its limits also being defined by a radius of fifty miles from the city hall. The immediate cause of its birth was the need of a representative local team for the Sesqui tournament.

Further down the seaboard the old Potomac Archers had sprung into new life and were a centre for Maryland and Virginia as well. Somewhat later the Carolinas formed a bi-state association with headquarters at Pinehurst. Many of the winter resorts of Florida had flourishing clubs.

Most of these, as well as scattered clubs and unattached archers, helped the older clubs of New England to maintain a strong Eastern A. A. by sending representatives to its annual championship tournament.

The archers on the other side of the Alleghenies, however, seemed drawn to the west rather than to the east. It was therefore a natural step to consolidate the great area between Ohio, Missouri and North Dakota into a Midwestern association, centering in Chicago but holding its tournaments in any city where enthusiasm ran high. The best archer developed within it is the present champion, Russell Hoogerhyde.

Immediately after Spencer won the championship of 1926, the Southern California Archery Association was established. It has produced the greatest number of expert archers of any organization known to history. Such champions as Roberts, Douglas and Spencer are followed by many others of almost equal skill. In the tournament of 1929 about fifty percent of the men shot a single American of over five hundred.

The old Pacific Archery Association was revived for northern California, with the greatest activity in the vicinity of San Francisco. From the archers of this region have come our foremost hunters of big game.

The Pacific Northwest Archery Association has sounded a modern note of international harmony by boldly bridging the border between the republic and the dominion. It is composed of the four corner states of Washington, Oregon, Montana and Idaho and the territories of British Columbia and Alberta, with Alaska taken in for completeness. Each of the Pacific regions has a specialty. As the others excel in target shooting and hunting, so the northwest has developed flight shooting to astounding lengths.

The territory of these three associations, with the rest of the western states that are not otherwise attached, is covered by the Western Archery Association.

More recently the Southern Archery Association has come into being. It includes Missouri, Kentucky and the states south of them to the Gulf of Mexico, possibly being most active at present in Tennessee and Oklahoma.

All four of the major associations hold large annual championship tournaments, all exist under the sanction of the National Archery Association and all are solicitous for the prosperity of the many local clubs within their boundaries. Undoubtedly their geographical limits should be more clearly defined and their powers made more definite, but they are very active and efficient bodies as they now stand and improvements will surely come with natural growth and maturation.

## VI

### THE CONDUCT OF TOURNAMENTS AND MATCHES

I WILL not try to examine into the history of matches that were held in England before the days of modern archery because practically all that I have been able to find about them is described in this book under other headings. It seems best to me to tell exactly how modern American tournaments of the first class are conducted and afterward to mention the modifications which may be necessary to meet the conditions of small matches between individuals or clubs.

The Annual Tournament of the National Archery Association is the model on which all others are based and because of nearly half a century's accumulated experience it has become standardized to an extent which assures a satisfactory lay-out of the ground and smoothness in carrying out the program of shooting. Let us begin with the physical side.

Naturally, in looking about for a field that is large enough for an unabbreviated tournament we first recall to mind the events which need the longest range. These are the flight shoot, for both men and women, and the clout shoot. As the flight shoot record is now over 400 yards it is not always easy to find a field that will take it in its entirety. Fortunately, however, this is not at all necessary because no one is likely to compete in such an event who cannot cast, at the very least, 150 yards, and it is therefore quite possible to place the shooting line about that far away from the nearest edge of the field. It does not make very much difference where a flight shooter stands, provided it be on about the same level. For example, the school field opposite my house is 206 yards wide, but I can get a splendid flight range by shooting into it from my own yard across the wide street. At the 1920 tournament of the N. A. A. we shot on the football field of St. Luke's School in

Wayne and were therefore limited to an area of about 150 yards by eighty. For the flight we stood afar off in an adjacent field.

The clout for men needs 204 yards from the shooting line to the outer edge of the forty-eight foot target. Besides this at least twenty yards more should be allowed at the clout end for overshot arrows and a few yards behind the shooting line make it much pleasanter for the archers. If space allow, I think that a range of 240 yards should be measured off for the men's clout shoot, although 228 will do if there be no more ground available. In this event also the archers may stand on another property and shoot over into the tournament field if it be thought advisable to do so.

However, it must never be forgotten that both the flight shoot and clout shoot are extremely dangerous events. If there were no wild arrows there would be no danger, but, unfortunately, it is in these events, where a slight divergence of trajectory is magnified to the utmost by reason of the great distances, that the jerky style of shooting gives rise to the most mistakes in aim. I remember only too vividly that at Wayne, in 1920, one of my shafts stuck in the ground less than a foot from a young lady. At the national tournament of 1924, at Deerfield, a shaft sped by Professor Curtis came sailing over the roof of the academy and shot a boy in the arm before my eyes. At the E. A. A. at the same place, in 1925, the clout shooting was done in the opposite direction but even then if it had not been for the kindly vigilance of Mr. Ives, who had learned from experience what an arrow wound means, there would probably have been two more casualties. In the first instance some spectators were seated on a narrow cement walk, close to the academy building and probably twenty yards from the edge of the target. Mr. Ives advised them to move behind the building and they had not long done so when a shaft struck that very spot and dug a groove in the cement at least a quarter of an inch in depth. Also Mr. Ives



moved back some boys who were lying on the grass at what would ordinarily have been a very safe distance and in a few moments an arrow alighted just where they had been. It may be the very best archers who make these wild shots. The one in the cement was from Crouch himself, who won the event with a large score and who had broken the double American round record the day before.

I go into this so fully because it is a temptation to place the clout target, which is marked out on the grass, comparatively near the spectators so that they can see it clearly and note by the paint and feathers of the arrows who is making the best score.

If the limits of the shooting field may be thus artificially stretched for the flight and clout shoot no such thing is permissible for all of the other events, which require ranges of from 30 to 100 yards. Thus, after all, it is the York round which determines the limits of our field.

If there be ample room, as on a polo or baseball field, a tournament range should be laid out as follows:

First mark off the shooting line as a baseline on which to found all other measurements. Preferably it should face toward the north, so that the sun will not shine in the eyes of the archers nor throw the target faces in shade. Sometimes, however, there may be stronger reasons for shooting the other way, even straight against the sun. For example, the 1914 tournament was held on the grounds of the Merion Cricket Club at Haverford, Pa. Here the long house, with its veranda crowded with spectators, faced the south.

If we had gone out into the cricket field and shot toward the house it would have been terribly dangerous to the spectators and also utterly uninteresting to them, as they would have seen only the backs of the targets. Obviously the only practical plan was to run the line parallel to the front of the house. At Wayne the field ran east and west and we kept the sun out of our eyes by shooting the short ranges across the

field and placing the 100-yard targets at one end or the other according as it were morning or afternoon.

However, we start with the shooting line laid off in the best place, shaded by trees if it be possible. Most of us archers are indoors people and a shooting line so placed that we are always in the sun causes many of us to become painfully sun-burned.

Behind the shooting line, at a distance of from ten to fifteen feet, should be stretched a rope to limit the space for spectators. From long suffering experience I have almost decided that nothing less than barbed wire entanglements raked with machine guns will keep visitors from intruding on the space reserved for the archers. For a number of reasons their presence inside the rope is most undesirable. Usually enough chairs or benches are provided for the contestants to sit in, but anyone who has seen a tournament notices immediately that using a chair for its natural purpose is the last thing an archer seems to think of. Every man brings a large box of arrows, and sometimes an additional hand-bag filled with extra strings, gloves, mending materials and other accessories of shooting, and, besides the bow he expects to shoot with, he often has one or two more to use in case of an accident to his favorite. As it has often rained just before the shooting and he does not wish to let his paraphernalia get wet, or perhaps, as it is so dry and hot on the ground that he is afraid his arrows will lose their spine or his bows their cast, he piles all his tackle, with his coat or sweater, in the chair he is expected to sit in. So universally is this true that I have often thought that an ideal arrangement would be to have two rows of furniture, a line of chairs about three yards back of the shooting-line, and, just behind them, a line of benches or tables for the archers' gear.

The shooting-line should be clearly marked out in chalk, slaked lime, marble dust, land-plaster or any other white powder that will not kill the grass.

Until 1919 it was always the custom to mark the distances of the different ranges with parallel lines, on which the targets were set at the proper places, marked by short cross-lines. It was a good way, made the field look attractive and was of great help in finding points of aim, as at that time artificial points of aim were not used. On the other hand it involved a great deal of work and made more lines than were desirable on a field which perhaps immediately after the tournament was to be used for some other game.

In 1919 Shepherdson was master of the green at Boston, and with his customary originality he introduced the method of marking each spot with a peg, thus using only one marked line.

If the field be large, or the archers few, the targets look very well spaced fifteen feet apart, but if it be necessary to get a great number of targets into a limited distance they can be put ten feet apart. Nearer than this they should not be placed, except under strict necessity.

Bearing these facts in mind, the next step in the actual preparation of the field is to measure off distances of ten or fifteen feet on the shooting-line and drive a short peg flush with the surface of the ground at each point. These mark the positions where the archers are expected to stand and are to be directly in front of their targets. However, there is nothing in the constitution to forbid an archer from standing anywhere else in his ten or fifteen feet if he chooses to do so for the purpose of getting a better aim.

Half-way between these pegs are bow-rests, which are very simply made by driving stakes in the ground and nailing cross-pieces on top of them. The stakes are about four or five feet high and the cross-pieces are about a foot long and made of one-inch by four-inch lumber with four indentations or nails in each side to lean the bow against. Sometimes they are nailed together on the ground, but usually they are made up previously and painted green.

With the shooting-line and the region behind it thus completely finished the next step is to find the positions of the two end targets at 100 yards. Sometimes someone happens to have a surveyor's transit, and then it is very easy. You simply set it up over the first peg, swing it around at right angles and measure off 100 yards with a steel tape.

If you have no transit you may find the right angle by remembering the geometrical theorem that the square of the hypotenuse of a right angled triangle equals the sum of the squares of the two other sides. In laying out houses builders use three, four and five, or multiples thereof, as nine plus sixteen equals twenty-five. Let me urge you in all sport measurements to use steel tape rather than the cheaper linen, as the latter is sure to stretch and lead to embarrassing inaccuracy at times. If you buy a new tape for the purpose of laying out a ground get one with swivel joints placed in it at the right places to form this triangle. It is called a contractors' and builders' tape.

Having found your direction and measured off the 100 yards, drive a peg there. This peg is not only a marker of position, like those on the shooting-line, but it also serves the purpose of an anchor for the tie rope of the target. It often happens that during a tournament a sudden gust of wind will come up and blow the targets over if they be not securely pegged down. When Harry Richardson was shooting with Will Thompson at Seattle, before their hunting expedition of 1911 into British Columbia, he used the arrows with which he had made the double York record the year before. When they were all in the target, at one end, a gust blew the stand over and broke them. Thompson wrote to me about it and said that, sorry as he was, he could hardly help laughing when he heard Harry exclaim, "There go the six best arrows the Lord ever made." My target blew over in the same way, from a sudden wind, at the E. A. A. in 1925, when I was in the middle of my second York. Fortunately I had shot only two

arrows, which were of course broken, and we all took a recess for pegging the legs more securely before the shooting continued.

It used to be that we drove a peg beside each leg and tied the leg to it. There is no better way than this if time and trouble are no object, but Shepherdson devised the much simpler, and sufficiently effective way, of leading a single rope straight down from the apex of the target-stand to the peg. To make it tight the rear leg is moved back a little, thus lowering the top, the string is tied and the leg shoved up again till the string is taut.

The peg should therefore be at least ten inches long, deeply driven into the ground and should have a quarter-inch hole bored through it near the top in which a large wire nail is rather loosely set. You can then secure the rope to this nail and loosen it easily when you want to move the targets by pulling the nail out with the fingers.

When the pegs for the end targets are driven it is an easy matter to stretch a string between them and measure off the appropriate positions for the other pegs on the 100-yard line. Similarly, when these pegs are driven, lines are stretched from them to the pegs on the shooting-line and positions marked off on them for all the other places to which the targets will be moved. This is most easily done by measuring the distances on the end lines and stretching strings across, thus marking and pegging all the intersections.

Marking out the ground for the ladies is exactly the same except that the longest range is sixty yards.

When the targets are put near each other, in a long line, it is very easy for an archer to mistakenly focus on the wrong one and thus lose the value of a hit even if he make one, as the constitution expressly legislates against such carelessness. The danger of this accident is much less when pegs are used instead of lines, as the series of pegs points straight from the archer to the gold. Yet, in order to still further guard against



it, a custom was originated in 1926 by President Palmer, which is now incorporated in the by-laws, requiring that each target should be surmounted by a cardboard marker. These are made in sets of three, numbered A1, A2, A3; B1, B2, etc., and, for easy distinction, are cut into the shapes of square, triangle and circle.

The entire management of a tournament is in the hands of a Tournament Committee, appointed by the president, except that the actual shooting is directed by a Field Captain and a Lady Paramount, serving respectively for the men and women. Only the former will be considered, as their functions are identical save that appeals from decisions of the Lady Paramount may be taken to the Field Captain for final adjustment.

As the success of a meeting depends largely on the ability, tact and discretion of those two officers, they should be selected with discerning care.

Before the shooting begins the Field Captain should make sure that all the archers are on the grounds, should have them draw for targets or appoint them by other means and should see that practice is fairly done. He should then signal, by whistle or by the more idoneous horn, for the start of competition.

Practice before shooting should be spoken of before we proceed farther.

When I began to take part in tournaments in 1911, and for all the previous years, an archer was not allowed any practice shots and was obliged to face the target "cold," or without warming up his muscles. I do not think that this custom was abolished till the first tournament after the World War. Mrs. Howell wrote me that she even adhered rigidly to this rule in private practice and all her great scores were counted from the first arrow shot. So were most, or all, I think, of a run of eight single Americans of over six hundred which I shot in the fall of 1917.

Nowadays practice shots are permitted but they must be at



a special target and never at the one which the archer is to use while in competition. If the time be short the number of arrows is sometimes limited by the Field-Captain, but usually a man may get on the field as early as he likes and shoot till his coördination is working smoothly.

It used to be that an archer could select any target he chose and shoot in the company of selected friends but, as that gave rise to obvious inequalities, it was changed a few years ago to the fairer system of choosing one's target and target mates by chance. The modern practice is to place in a hat three or four numbers for each target, according to the size of the list of competitors and to let each man take one out, sight unseen.

As soon as the numbers are drawn the archers collect their paraphernalia and take it to their proper targets. They should stay there where they belong, and not roam about visiting their friends, until the Field-Captain comes down the line and appoints one to be Target-Captain and another to be Scorer. There should be some thought given to these little elections. A good many questions arise during a day's shooting, and the Target-captain should be an experienced veteran who can answer them with promptness and certainty.

Particularly is this true with regard to making close decisions as to which ring an arrow is in if it be very near the edge. Sometimes new men do not realize that the championship may depend on one or two points and in a feeling of good-fellowship give the benefit of the doubt to the archer.

There should not be any benefit of doubt. It must be a question of absolute fact, and if the Target-Captain be not perfectly certain he must call on the Field-Captain for a ruling. The constitution says that if an arrow cut two colors it shall count as having hit the inner one. In most cases the decision is obvious, but there are many arrows that touch by less than the breadth of a hair. In such cases one should not hesitate to summon the Field-Captain, and should remember that generosity to a friend may mean the downfall of an opponent.

The third and fourth men are called "arrow-hounds," and pick up the shafts which have missed the target

At this time the Field-Captain blows his whistle and one archer from each group, according to the order prescribed by the Target-Captain, straddles the shooting-line and speeds his first three arrows. It is only in case of great necessity, such as the approach of a storm, that two men shoot at the same time at one target. In fact, I cannot remember that I ever saw it done in a national tournament. Many men who practice alone are much annoyed by having other archers shooting immediately in front of or behind them and should not be handicapped by having to tolerate it. Besides, it limits an archer's freedom to move about and to find what seems to him the best point of aim.

As soon as the first lot of men have shot their three, they step aside and give place to the second set, and so on for the third and fourth. I might say that it is well never to have more than a quartette at a target as the match becomes too long drawn out. When all have shot, the first man shoots three more, thus completing his end, and the others follow as before.

There are always some archers who shoot more slowly than the others, but it is a strict rule that no one shall advance on the range toward the target until every archer has finished and the Field-Captain has given the signal. Neither must any archer be unduly hurried, even though time be pressing, unless he show a willful attempt to delay the game.

The march down the range to the targets is one of the pleasantest moments of the tournament. Very few sprinters can better ten seconds for the hundred yards and when several score men walk it at an ordinary pace, stand several minutes at the targets and return to the shooting-line they have spent almost as much time as in the actual shooting. This is the opportunity for conversation, relieved from the perfect stillness which should prevail while shooting is in progress. As

I have said in other places the archers are almost always cultured people of originality and imagination, with whom it is uplifting to associate, and I look back to hundreds of little walks and talks together with a sense of pleasure that few other reminiscences can offer.

When, finally, all the ends of a given range have been shot, the targets are moved to the next shorter range, as all rounds begin with the greatest distance first. This hard job is sometimes performed by hired men, but they are usually so slow and stupid that the archers have to supervise them closely and often they prefer to do it themselves. It is not necessary to take the target off the stand during the moving, and there are several ways of going about it. If one man essay the task he should stand within the three legs of the tripod, lean his back against the target, take the two front legs in his hands, lift it off the ground, hold the third leg clear with his forehead and either walk backward, in which case he will save turning around twice, or else turn slowly about like a turn-table, proceed to his peg, revolve again and lower his load. If there be two men each takes a front leg with one hand and the hind leg with the other and the whole thing is easy.

No doubt you may wonder why the archers do not move toward the targets and avoid all this trouble. In private shooting it is always done that way and, of course, if butts are used it is obligatory, but in tournaments the spectators are considered. If they be in a grand stand the archers would begin in front of them at the hundred-yard range and end up sixty yards away at the forty. Besides, the shooting-line is usually placed in a shady spot, or near one, and moving forward would mean spending the day in the broiling sun.

In England two sets of targets are used, the archers shooting only three arrows at an end in one direction and then three back in the other. It is their ancient custom and they like it, but to us it seems to have the disadvantage of requiring twice as many targets and making it very unpleasant for the spec-

tators, who must either tramp up and down the field, or view the shooting from a considerable distance to one side.

While some latitude in arranging the program of a national tournament is left to the tournament committee, yet the by-laws specify that six rounds, on which the championships depend, be given precedence over all other events and be shot to conclusion even though to do so mean a prolongation of the duration of the tournament. These mandatory events, all of which are in the double or repeated form, are the York and American for men, the National and Columbia for women, the Junior American for boys and the Junior Columbia for girls. Flight and team shoots must also be provided for adults. For juniors they are not required by law though they are never omitted in practice.

It is also customary though not obligatory, by using the discretionary powers vested in the committee, to provide special contests for intermediates, or adolescents of both sexes aged 16, 17 and 18. The Hereford and American serve very well for the young men, thus making eighty yards their maximum range, while the young women shoot the same rounds as their elder sisters.

Perhaps the following is the most satisfactory outline of a program for adults, the events for intermediates and juniors being inserted where most convenient:

	<i>Men</i>	<i>Women</i>
1st Day A. M.	100 yards of 1st York.....	1st Columbia
P. M.	80 and 60 yards of 1st York.....	1st National
2nd Day A. M.	100 yards of 2nd York.....	2nd Columbia
P. M.	80 and 60 yards of 2nd York.....	2nd National
3rd Day A. M.	1st American.....	Same as men
P. M.	2nd American.....	" " "
4th Day A. M.	Team .....	Same as men
P. M.	Clout and Flight.....	" " "

Before the war, any extra time was filled in by handicap matches. To most of the archers those footless repetitions were both uninteresting grinds and misleading registers of merit and so in later years they were gladly exchanged for

## TOURNAMENTS AND MATCHES 201

revivals of the ancient trials at clout and wand or even for whimsical novelties.

Of the events for men the Clout, Novelty and Wand Shoots need not be held if the tournament committee do not choose to have them. If they be put on the program, however, they must be laid out and shot as described in the by-laws in order that they be authentic and that the scores made in different years may be compared.

The same remarks apply to the Wand, Novelty and Clout Shoots for women. Inasmuch as there are annual prizes for at least two of these events, the Wand Shoot for women and the Novelty Shoot for both sexes, it seems that courtesy to the donors would suggest that they be competed for whenever it is convenient to do so. In actual practice it has been found easy to kill two birds with one stone by staging a Clout or Wand Shoot in the guise of the Novelty Shoot for the year.

Every N. A. A. tournament begins on Tuesday and ends on Friday, thus giving a day or two for practice before the match and allowing two days of rest afterward.

The Annual Business Meeting should never be squeezed into a noon recess in the shooting, but should be an affair of a leisured evening. There is always an astonishing amount of business to be transacted and the officers should be selected with the best interests of archery in view.

On the last night there is a banquet at some club or hotel. I have never been to any other feasts exactly like them. After four days in brilliant sunshine the ladies all have faces like red apples and their necks seem to be tattooed in various patterns according to the texture of the garments they have been wearing. The men are the same but more so, and the general impression is of abounding health. Everyone dresses up according to the amount of luggage he has brought and the result is interesting even if not sartorially standardized.

Small matches are not nearly so formal. Nearly always the targets are left in place and the archers move up to the required

distances. As time is more limited several archers may shoot at once at the same target and deliver all six shots without stopping. In fact any small changes which do not alter the fundamental rules of shooting may be agreed on by the contestants.

In recent years the great number of participants in a national tournament has permitted the addition of many conveniences. There are dressing tents for men and women, a luncheon booth, loaned or rented to a concessionaire, a storage tent to protect the targets from possible rain at night and, in the centre, a headquarters marquee where the self-sacrificing secretary and his staff sweat over their computations. For the archers, relief from the scorching sun is afforded by awnings or open tents, as are often available in the parks of large cities, or by a large beach umbrella for each set of target mates.

By the new rules, those companionable groups can no longer remain together from the beginning but, after the first round, are assorted and replaced according to their merit. This rearrangement not only puts the best shots together on the top targets, which probably helps to boost the winning scores, but makes for equal and interesting rivalry all along the line. At each subsequent round, every group advances to the next target of the three under its letter, as A1 to A2, A2 to A3 and A3 back to A1.

Perhaps this chapter should not close without speaking of score-cards. In private shooting it is enough to record each end but in competition that should never be relied on. Too many mistakes are made in such a great number of hasty additions and grave injustices may be done with no chance of correcting them. I do not think I exaggerate when I say that four score-cards out of five at each tournament are found to contain mistakes in arithmetic. The only safe rule is that the scorer should record the value of each hit as the arrow is



J1

THE NATIONAL GEOGRAPHIC SOCIETY OF THE UNITED STATES

COLUMBIA

Mrs. D. Cummings Miss D. Duggan Miss S. Roach Mrs. L. McChene

Aug 11 '31

997755 6 36 ✓	997755 6 40 ✓	75553 5 25 ✓	75553 6 28 ✓
997755 6 38 ✓	997755 6 40 ✓	997755 6 36 ✓	77755 5 31 ✓
997755 5 33 ✓	997773 6 42 ✓	99773 5 37 ✓	99773 11 6 30 ✓
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24 166	777775 6 42 ✓	997777 6 46 ✓	777555 6 36 ✓
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A-2  
14

Aug 13 '31

Rus. Hrozyhyde A L Brush P W Crouch

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997753 6 38	999555 6 42	997773 6 36 ✓
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90 678	29 211	89 533
	88 590	

90-698

88-590

89-553

SCORE CARDS



drawn by the Target-Captain, so that the figures may be added at leisure and be subjected to subsequent auditing.

Experience has shown that the simplest form of card is also the best. Formerly different ones were printed for each event and ruled for the appropriate number of arrows, but now one card serves for all ranges, whether shot by men or women. It is a piece of cardboard, about eleven inches square, and ruled for four archers. At the top is a space for the name of the event and the date. Under that is a line for the names of the contestants. Under the name of each archer are six columns for the six arrows of each end, two columns for the hits and scores of each end and two columns for the totals for each distance and for the final score. There are thirty transverse lines, which give plenty of room for any kind of round, but the scorer is left to make any special cross-lines to mark the divisions between the distances.

## VII

### CONTINENTAL ARCHERY

THE American who makes a study of Gallic archery will meet with surprises from the beginning of his investigations until the end. We have derived practically all our traditions of the sport from English sources and have heard so much of the supremacy of the military bowmen of England in the middle ages that we are apt to suppose that archery on the continent was practically non-existent. The first surprise might be, therefore, to learn that before the war put its blighting hand on European sport there were probably twenty thousand archers in France as against an extremely liberal estimate of four thousand in Great Britain.

It would be surprising, also, to the student of the literary side of toxophily to learn that the oldest European book on archery is now in the public libraries of Paris. It is an ancient tome, printed in coarse wooden black letter types of the fourteenth century and is called "The Book of King Modus" (*Le Livre du Roi Modus*). The author is unknown but internal evidence of its date of publication, aside from that given by its dialectic forms and by the state of development of the printers' art is furnished by the following sentence:—"And I saw the King, Charles le Bel, who hunting one day in the forest of Bertelly took twenty-six wild boars, without a single one escaping." Charles le Bel died in 1328.

It thus antedated Ascham's *Toxophilus* by about two centuries but it is quite a different sort of book, though a very valuable one. While it does not enter into the details of archery tackle as Ascham did it does give very fair directions on many important points, among which are the following:

The string be made of silk, rather than hemp.

The finger-draw be used.

The steel pile be not too heavy.

The feathers be cut low and short.

Flat arrow-heads be set parallel with the nock.

An arrow be thirty inches from the nock to the barbs.

(Ten handfuls.)

A bow should be five foot six inches from nock to nock.

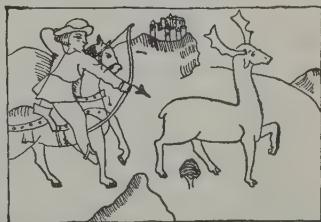
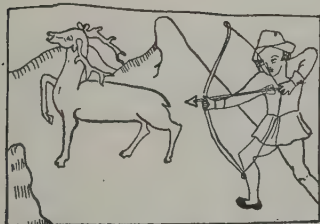
(Twenty-two handfuls.)

(The handful is supposed to be three inches but there is room for doubt.)

A bow should be strung a palm and two fingers deep.

Hold the bow in the left hand and draw with the right.

The rest of the book is a series of interesting and quaint directions on the proper way of hunting stags, boars and hares with the bow.



From *The Book of King Modus*.

Small as this book was it evidently exerted a lasting influence on French archery which was somewhat analogous to that of *Toxophilus* in England, though I imagine to a much less

degree. At any rate it is extensively quoted in a book of extreme rarity, only one complete copy and a mutilated fragment of another being known, that was called *La Fachon de tirer de l'arc a main* (the fashion of shooting with the hand bow) or *l'Art d' Archerie*, which was published at Paris by Michel Noir about 1515, just thirty years before *Toxophilus*. It is quite different from the book of King Modus and has nine short chapters which have been given the following captions:

Concerning the nature of wood for making bows.

Of the make of hand-bows.

Concerning the horns for bows.

Of bowstrings.

Of the shaft used with the bow.

Of the glued arrow.

Of flight arrows.

Of putting a string on a bow.

On the way of shooting with a bow.

Most of it is too common knowledge to need reproduction here but some things are of interest. It says that red Italian yew is better than white Portuguese and recommends examining the grain on the sides to see if it be close.

Bows for butt shooting should be made square because they have a broader back and therefore last longer, because the arrow lies better against their side and because they shoot straighter.

Bows for flight shooting should be only two arrows length and one fist and should have a narrow back. The smaller the horns the better.

Strings should be made either of silk or of fine female hemp, which is finer than male hemp. They should be gummed and not glued.

Butt arrows are made of aspen seasoned two years without heat, flight arrows of birch or cherry. Here is an interesting quotation: "If you would know what is a sheaf arrow, according to the English, every glued (feathers glued on) and



iron-headed shaft, whether big or little, is called a sheaf arrow. Flight arrows may be hollow, or bored from the head to within three fingers' breadth of the feathers. Some fill them with quicksilver which gives a dishonorable advantage."

The directions for loosing are quite new to me and may explain the position in which mediæval archers are always shown, with their feet apart. "Loosing depends on the step, of which there are three kinds. The one-step loose is done in two ways, one by stepping forward with the foot of the bow-hand side, and the other by bringing back the arm, pushing out the bow and arrow, and at the same time stepping back with the other foot; this step straightens the arm but it must be a long and sharp step back. To shoot with two steps a backward step must be taken with the hindermost foot, so that on bringing the front foot down, sufficient impetus is given to effect the loose. For the three-step the front foot is moved forward, then the bow is thrust forward and then the hinder foot is brought back in such a way that when the arrow is loosed one can step forward with the front foot."

Curious old rules these are but they give the mediæval viewpoint and elements of truth seem to struggle for expression in most of them. The stepping about at the time of shooting is something that I believe very few archers have heard of. From the dialectic forms the writer was evidently a Picard.

After those two ancient volumes, I know of no work on archery that was written in France until the present century, though I have never consulted the catalogues of the great French libraries for proof. In 1900, Hachette et Cie., of Paris, published an excellent book called *Le Tir à l'Arc*, by Count de Bertier, one of the very few modern Frenchmen of high social position who have been active archers. In 1925, D. A. Longuet, also of Paris, brought out a superb volume by Henri Stein whose scope is indicated by its title—*Archers d' Autre Fois: Archers d'Aujourd'hui*.

Returning to the subject of the great number of French

archers I may say that I am inclined to give full credit to Count de Bertier's large estimates, for I have personally counted the names of 540 French towns which, at least before the war, had archery societies and, as many had more than one, the total number of clubs must have been about 600. In Belgium there are, or at least were, 310 societies, of whom 249 shot at the popinjay and sixty-one at targets.

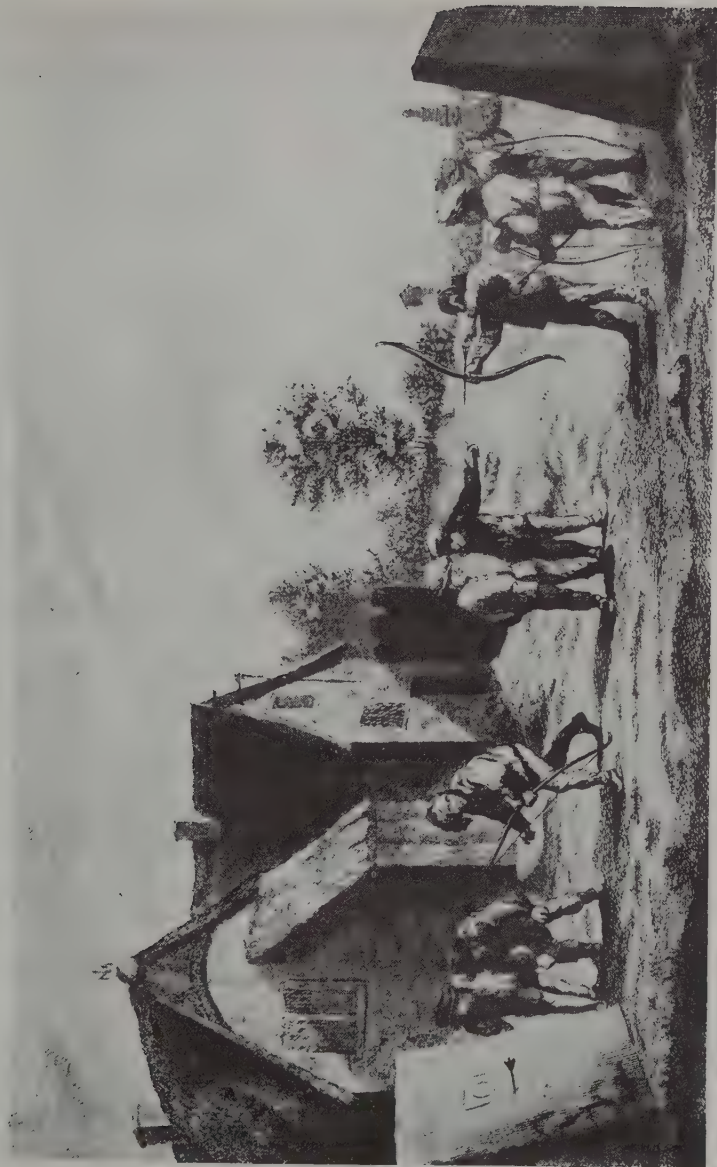
In fact, all over that part of Europe, archery is divided into those two forms and neither of them has much resemblance in detail to the sport as we know it.

Instead of shooting in the open air, as we and the English do, the Frenchman or the Belgian shoots in a *Jardin des Archers*, or Archers' Garden. It is more open than a shooting gallery for rifle practice and is undoubtedly very well adapted to the climatic conditions of Northern Europe but it is different from what we are accustomed to and is therefore interesting to learn about.

In general there are two butts, sometimes called *berceaux*, or cradles, which are made of compressed straw and are placed a little farther apart than the distance to be shot. Over each butt is built a shed, or three-sided house, often of great taste and beauty. Some of the older ranges are lined with rows of trees and some are bordered either with fences of planks or by boards at right angles to the line of shooting and spaced a few feet apart to stop stray arrows. The space above, between the *berceaux*, is open to the sky. The archers stand either in, or near the shed, each having a bow and one arrow. When one's turn to shoot arrives he stands on a flagstone, or plank, in front of the shed, called *Le pas de tir*, or shooting step, delivers his shaft and files out in order.

The *berceau* at which the shooting begins, which is nearest the entrance to the garden, is called *la maitresse butte* and the other is called *la butte d'attaque*, words which anyone ought to be able to translate whether he knows French or not.

The archers then file to the other butt, determine who is



FRENCH PEASANTS

CENTURY-OLD PRINT IN SCRAP-BOOK OF UNITED BOWMEN OF PHILADELPHIA



nearest to the centre, or in some cases figure a score, and shoot back again at the butt from which they came. The two arrows, or rather the going and returning, are called a *halte*. The usual shoot, or *tir*, is composed of twenty *haltes*, or forty arrows.

If standard targets were used all over France, and if the distance were the same, there could be an interesting comparison of scores, as there is with us, but I cannot find that such has been the case. Most societies shoot either at the very short distances of twenty-five, thirty and thirty-five metres (a metre is about thirty-nine and one-half inches) or at the maximum range of fifty metres. I remember that at the Olympic Games at Antwerp the distances to be shot began with twenty-eight metres and ended with fifty.

The targets are very confusing and have none of the simplicity of ours. The most usual one is a card .75 metres high and .60 metres wide. It is marked with a white bull's-eye of .010 metre, a black ring of .035 metre, a red ring of .15 metre and an outer black of .40 metre. These are, of course, all diameters, not radii, and the whole counting space is therefore less than sixteen inches across with a bull's-eye, or one might better say pinhole, of less than half an inch.

The names of the three rings from outside in are *cordon noir*, *cordon rouge* and *chapelet*; or black ring, red ring and wreath or rosary. So far as I know these rings have no specified value in ordinary shooting but no arrow outside the *cordon noir* is counted and the one in or nearest the white centre is the winner.

Sometimes great provincial tournaments are held which attract as many as 1,500 to 2,000 archers, numbers which seem incredible to us, and the usual value of the prizes (1900) was from 8,000 to 12,000 francs. On these occasions a larger target with rings of different colors is used. The card is 1.06m by .76m and the circles are .47m and .125m. These are colored black and gold and the bull's-eye is a black of .04m or about

an inch and a half. The inner circle and bull's-eye are covered for each shooter with a little piece of paper called a *marmot* which is finely divided by circles and radial lines and which is taken off and kept as a record if it be hit.

In 1898 a match for the championship of France was established at Fontainebleau.

The rules governing this match are here given in full in case some American or Englishman in his summer vacation may wish to compete in it.

#### FIRST PRIZE

1. A scarf embroidered in the national colors with the arms of the Chevaliers of the bow.

2. An object of art.

The classification of the archers admitted to compete for the title of Champion of France will take place in the course of the *Prix General* (general prize) which must be followed by the shooting for the Championship.

The Chevaliers who shall have made at least twenty-five hits in the large gold circle will be entered for the competition for the Championship. This match will take place on the day of the distribution of the prize.

The shoot will be twenty ends or forty arrows.

To avoid a new match between the archers for the Championship and to prevent all disputes, the cards will be graduated so that for an equal number of arrows the Championship is given to him who has the greatest number of points.

The title of Champion exists for one year. The victor must, to preserve his title and to defend his scarf, compete each year in the Compagnie which will have retained the Championship.

These seem very simple rules and as we look on such things, extraordinarily incomplete. No mention is made of distances, fees or many other vital things.

The records of the first two of these meetings is the only evidence I have of the real skill of the French archers at their own game. The *cordon doré*, or gold ring, is forty-seven centimetres, or about eighteen and one-half inches. Fifty





JOSEPH CHRISTOPHE  
CHAMPION OF FRANCE, 1925



metres, which presumably was the distance shot, is about the same as our sixty yards and the counting area is equivalent to our gold and red.

In 1898 thirteen contestants had put more than twenty-five arrows out of forty in the gold ring and in the final shoot-off for the championship Chevalier Cutard, of the Compagnie St. Pierre de Montmartre made twenty-seven hits and Chev. Camille Petit of the same company made twenty-two.

In 1899 twenty-three men qualified and Chev. Joseph Bergeron of the Compagnie de Bethisy (Oise) was Champion with twenty-seven hits.

This seems to me to be fully equal to the best shooting that we English-speaking people can show under the stress of major competition.

Another event which gives us an idea of the relative skill of the French and English was at the Olympic Games of 1908, which were held in England. The Frenchmen gallantly essayed the York round, to which they were quite unaccustomed, but made very poor scores, as was to be expected, their best for the double York being 95-425.

In the special competition of forty arrows at fifty metres, shot in the continental style of one arrow at an end, there were fifteen Frenchmen, nine Englishmen and our own American, Henry B. Richardson. This was in the same month in which Richardson made the highest score at the Grand National of England, so we must concede that he was in good form.

Regulation English targets were used and the leading scores were:

M. Grisot, Cie. de Ulysses à Paris.....	39-263	9	golds
Mr. R. O. Backhouse, H. Y. R.....	40-260	9	"
M. Vernet, Ire Cie. de Compiègne.....	40-256	7	"
M. Cabaret, Cie. de Montmartre à Paris.....	39-255	10	"

Richardson made 33-171 with four golds, being beaten by all but two of the Frenchmen and three of the Englishmen. Back-

house averaged exactly 6.5 per arrow and Grisot slightly more and at sixty yards that is certainly meritorious shooting.

Wallace Bryant told me that he had shot in Paris with French archers and spoke in high terms of their skill.

By culling the pages of the *Archers' Register* from the date of the publication of de Bertier's book until the last volume appeared in 1915, during the War, I find numerous comparisons of the skill of the two races and a few additional facts about the French among themselves. Thus six tournaments were held in France during the summers of 1900 and 1901 in which the shooting was done at movable English targets in the open field. Perhaps these were small affairs from the Gallic point of view but even at that they were in some cases larger than many of our N. A. A. meetings. Here is a summary:

Place	Date	Distance	Arrows	No. Archers	Winner	Score	Gold
Bois de Boulogne..	16-6-'00	50m.	20	72	Lebrun....	20-114	3
Pierrefonds.....	15-5-'01	"	16	40	P. Fisseux.	16-84	3
Bois de Boulogne..	23-6-'01	"	20	84	Aubras....	19-123	5
Fontainebleau....	7-7-'01	"	"	30	.....	20-108	2
Soissons.....	28-7-'01	"	"	95	Salingre...	20-118	2
Coeuvres.....	25-8-'01	"	"	91	Quiqueret..	20-126	6

In this same article it is remarked that the *Bouquets Provinciaux* and *Concours Generaux* usually last six weeks. Whether the archers go home in the meantime and come back when it is their turn to shoot I cannot discover. There must be some sort of arrangement of that kind because 2,000 men could not leave their work for a month and a half and live in one of those little French villages just for a chance to shoot.

Those *Bouquets* are queer things, the origin of which seems lost in the mists of the ages. They are great meetings at which the various companies arrive with flags flying and drums beating and are received in state by the mayor of the town. They then draw for a place in a big parade which is held in great state with the town decorated and often a

triumphal arch built. The unique feature is a large bouquet of flowers, carried by girls dressed in white, which is blessed by the priest. After that ceremony a mass of St. Sebastien is held, either in the open air or in a ruinous church, customs of which I do not know the significance.

In 1903, C. Pownall, a well-known English archer, visited the Company of St. Sebastien in Bruges, of which Charles II and Queen Victoria were members. He found it an agreeable old brick house, consisting principally of two large rooms, which formed one side of a square enclosure, the other sides of which were formed by a brick wall. A plaster bust of Charles II stood over the fireplace and the panelled rooms and heavy furniture were very attractive.

He shot with about a dozen members at the *vogel* (German *bird*) and found that the bows were of only about thirty-eight pounds' weight. There was only one bird on the pole and it was hit only once when there was a sound like the crack of a pistol and the bird flew in pieces. A wire screen was provided but most of the men did not stand under it. Two of the men nearly got hit by the fallen arrows and Pownall felt more comfortable when he sought shelter.

In 1904 was held the first of the international matches at le Touquet on the north shore of France, of which there were destined to be six before the war stopped them. Eleven men and twenty-seven ladies attended from England. They shot the usual English rounds among themselves and the men shot two team matches with the French in which the English were badly beaten.

With thirty arrows the English shooting at sixty yards with ten men and the French at fifty metres (55.5 yards) with nine men the score was 187-827 to 249-1397.

In a regular continental match between forty-one French and Belgians, shooting seventy arrows at fifty metres, the highest score was 67-345 by Quiqueret.

In 1905 no French shot at le Touquet, except a couple of

countesses, and the meeting was remarkable only in that Sir Ralph Payne-Gallwey, using a Turkish bow and flight arrow, shot 367 yards.

At the third meeting in 1906 there were no French and no very good scores.

The next meeting was not until 1912 when, as before, there were none but English present. H. P. Nesham made an eighty-yard score of 45-273 in a single York of 103-511 but he only got 193-941 in the double. Ingo Simon, who later made the modern world's record, won the flight shot with 325 yards, two feet, two inches, using a Turkish bow.

Of the fifth meeting I have no record except that Ingo Simon made an amazing flight shot of 459 yards eight inches.

On June 26th, 1914, Ingo Simon made the present world's record of 462 yards nine inches. The wind was light, shifty and variable. In a team match of thirty arrows at twenty-eight metres with five archers on a side the scores were:

French, 435; English ladies, 352; English men, 330.

Those Belgians whom I have seen shoot at Chicago seemed to have no idea of using a point of aim but relied entirely on intuition. They used no gloves nor tips but softened the string by wrapping it thickly above and below the nocking point with common cotton string.

The French target arrows are more often tipped with horn than with metal, the piles being sometimes very similar in shape to ours and sometimes large and bulbous, with curves like the dome of an oriental mosque. The archers draw them high on the cheek, approximating the old draw to the ear that our English forefathers are supposed to have used at the butts or to the chin.

The more energetic style of shooting in the open air at the popinjay is even more popular in both France and Belgium than the quiet, protected archery of the "gardens." I will give de Bertier's description of it, beginning with a literal translation of his words:



“From time out of mind the *Tir a la Perche*, or popinjay shooting, has been one of the forms of archery held in honor in all countries, but, although in most of them it is now practiced only occasionally, in the north of France, and particularly in Flanders, the archers have little by little abandoned themselves almost exclusively to this kind of shooting.”

The perche consists of a mast of wood or iron about thirty metres high and thirty or forty centimetres thick at the base. This mast is surmounted by an arrangement made of iron called a *grille*, which much resembles in appearance the cross-bars of a telegraph pole, except that the cross-bars lessen in width toward the top, giving a conical shape to the whole. With the addition of this grille the topmost point, on which is placed the chief popinjay, or *Coq* (cock) as he is always called, is about thirty-five metres from the ground.

In a drawing of such a grille, which is before me, I note that the bar next under the cock holds two birds, the next two birds spaced further apart, the third four birds, the fourth eight, fifth eight, sixth ten, seventh ten and eighth twelve. Thus the whole number of birds on the perche is fifty-seven. The exact number of birds does not seem to be specified by a general rule as some grilles hold only twenty-one and some carry as many as sixty. In general the number of birds is the same as the number of archers. If the number of archers be very great the grille may be reloaded several times or there may be more than one mast.

However, the erection of a mast is neither simple nor cheap. Even in the years before the war the average cost for each was about \$500. They are not simply set in the ground like a telegraph pole, in which case only an expert climber could reset the birds, but at about a quarter of the total height from the ground they are set in a hinge, or fulcrum, so that when the lower end is sufficiently weighted to counterbalance it against the upper portion the whole may be swung up and down even by one man.

The objects which are placed on the bars of the grille are called *oiseaux*, or birds, the old word popinjay having become practically obsolete.

The birds on the extremities of the bars are called *grandes poules* or big chickens, if they be on the higher branches and *petites poules* if on the lower ones. All the rest are called, simply, *oiseaux*, or sometimes *guetteurs*, a word which also means a man up in a lookout tower.

Each bird looks exactly like the head of a croquet mallet with the handle pulled out. By the hole it is set so firmly on its rest that only a very strong, full blow will dislodge it. Several plumes are stuck in it to make it look suggestive of a bird, they being large or small according as it be a simple oiseau or one of higher value.

The shooting is all done for cash prizes. In ordinary matches the coq is worth five francs, the big and little poules four and three and the common birds two. In large matches the prizes are sometimes of an astonishing size, for example in 1892 at the little town of Antoing, near Tournai, there were 240 birds representing 50,000 francs, which at that time, when the franc had a normal value, was equivalent to approximately \$10,000. The coq was worth 10,000 francs or \$2,000, and the smallest birds 300 francs, or \$60. Each archer paid fifty francs entrance fee so that there would appear to have been 1,000 contestants if the money were all raised in this manner. I have a newspaper clipping taken in 1912 which gives the number of competitors for the championship in that year as being nearly 1,500, so perhaps these figures approximate the truth.

The bows used in this type of shooting are sometimes enormously strong. I have seen a few among Belgians in America which I could not draw at all. Count de Bertier thinks that the vertical position of the left arm permits the use of a stronger bow but I cannot see why this should make much difference, if any. I think the real explanation is that those

French and Belgian peasants are powerful laboring men of the heavy musculature which seems to be normal to their climate and can pull weights which would be impossible to the English and American archers of less active habits. Furthermore they shoot only one arrow at a time and have a considerable rest before the next shot.

Count de Bertier says that the bows in commonest use weigh from twenty-five to forty kilograms (fifty-five to eighty-eight pounds), but "some vigorous amateurs serve themselves with bows of fifty to fifty-five kilos" (110 to 121 pounds), and "one cites even those who have the power to manage bows of sixty to seventy-five kilos" (132 to 165 pounds). I see no reason to doubt these statements as Howard Hill has been known to shoot a 172-pound bow and I myself have seen Dr. Crouch draw the 150-pound bow with which he won the flight shoot in free style, nearly to the full in the ordinary manner. It is of course wholly a question of unusual strength and it seems to me that among thousands of Belgian glass blowers and iron workers many men might be found who had the necessary power.

As an example of the endurance of a well-muscled man I quote from an account of a match for a wager between a Belgian and a Frenchman at St. Maurice in 1890. From 6 A. M. to 7 P. M., with a half-hour for lunch, using thirty-five kilo bows (seventy-seven pounds), they each shot 1,300 arrows with a total effort of more than 45,000 kilos or 99,000 pounds or almost fifty tons. Those uninformed archers of this and other countries who belittle the French and Belgian archery do so most unjustly.

Iron tips are strictly forbidden in this kind of shooting because of the danger of their striking someone in descending. A special arrow is used which is called a *maquet*. I have one, made by Remi Gyselinck, of Detroit, which is exactly like those shown in the books. It is twenty-eight inches long and tapers from a small nock to a horn tip three-fourths of an inch thick

and flat on the end. It weighs about 600 grains and would therefore strike with a hammer-like blow.

While the shooting is going on the spectators and archers who are not shooting stand in sheds near by or keep at least sixty yards away from the pole.

The fallen arrows are gathered by a man who is protected by a huge hat made of heavy willow basketry.

While speaking of the weight of bows I should have said that in shooting at the butts some of the archers use weapons that weigh as little as thirty pounds.

It is natural to inquire as to the reason for there being so many more archers in France than in any other civilized country and one wonders also why so comparatively little is heard about them. I once asked the late Viscount de Branges de Bourcia, who was a member of the Wayne Archers, if there were any archers in France and he replied that he thought there were none at all. He was a man of polished education who had spent all his life, to the age of about thirty, in France, chiefly in Paris, and had served his term in the army. Yet with thousands of archers in his country he had never heard of one.

I think the reason French archers are not widely known abroad is twofold, first that the French by nature are the poorest advertisers in Christendom and second that in France the saying of *Toxophilus* applies at the present time very strongly: "Menne that used shootinge most and knewe it best, were not learned."

French and Belgian archery is for the most part in the hands of plain people and in the older countries of Europe the merry villagers can disport themselves as they will without attracting the attention of those higher up.

If the French had won battles of importance by the use of the bow, as the English did, history would automatically have enshrined the weapon in hallowed memory but such was not the case. While it is well proven that there have always been

archers in France they were never given any importance in military manoeuvres that was at all comparable to that of the crossbowmen.

Yet it is in the formation of a sort of militia, or companies of local guards, in mediæval times that we find the origin of some of the very companies which exist to-day and which have formed prototypes for the organization of hundreds of others in modern times.

From the most ancient times associations of all the fighting men of a town or village for purposes of mutual defense have existed in France as well as in other parts of Europe. In the case of large cities they were occasionally strong enough to win practical freedom from feudal vassalage but in most places, nearly all in fact, their functions were necessarily restricted to the suppression of brigandage, and to measures toward the preservation of order which would now be done by local police. It is probable that the archers' companies have descended from this ancient and honorable origin.

A company of Soissons claimed to have been established in 471, in the day of the Roman Empire itself. Up to the French Revolution the abbés of St. Medard de Soissons claimed to possess a charter from Charles the Bold (840-877) creating them sovereign judges and grand-masters of the Archers' Companies of the kingdom.

Soissons has always been connected with archery, at least before the World War. Whether the old Belgic tribe of Suesiones, who lived in the neighborhood in Cæsar's time, were bowmen I have not been able to discover. Yet 471 is so far back that one's imagination can easily run loose. In 826 the remains of Saint Sebastian were removed from Rome to Soissons. As he is the patron saint of archery and his name has been given to an immense number of archers' companies it may be well to say why he holds that particular post in the world above.

Sebastian was a captain of the First Cohort under the Em-

peror Diocletian of Rome, and was a devout Christian. When Diocletian persecuted the Christians, about the year 300, his attention was called to Sebastian's proselyting activities. He was called before the emperor and reasoned with but remained steadfast. He was thereupon ordered to be bound to a stake and shot to death. After the archers had left him for dead, a devout woman, named Irene, came by night to take him away for burial but, finding him alive, carried him to her house, where his wounds were dressed. No sooner had he recovered than he showed his courage by confronting the emperor and reproaching him with his impiety. Diocletian ordered him to be instantly carried off and beaten to death with rods. This was done and his body was first thrown into the cloaca, or great sewer, and later buried on the Appian Way, where a church was built over him which was a popular place of pilgrimage in the middle ages. As a young and beautiful soldier he is a favorite subject of sacred art, being represented as severely, though not fatally, wounded by arrows.



Martyrdom of Sebastian Carved on an Eighth Century Ivory Bracer.

That his remains were reburied in Soissons seems to me to imply that archery was strongly intrenched in the people of that locality and also that they were sufficiently important to be influential at Rome. To induce the papal authorities to part with as lucrative a drawing-card as his remains had been must have required strong political pull. Evidently the pos-



session of his body was a factor in the elevation of the abbes to their exalted post among archers a few years later.

In the thirteenth century, and thereafter, royal acts were passed which confirmed certain privileges enjoyed by the members of these societies and encouraged the formation of new organizations, thus proving beyond question that the companies had existed long before that time, especially as they were alluded to as "ancient."

In 1260 St. Louis had his own name placed on the registry of an archers' company at Paris and also published an ordinance requiring everyone to "take the exercise of the noble play of the bow."

In 1369 Charles V gave forth an order which was strictly enforced for several years, prohibiting games of dice and the like and ordering shooting with the bow or arbalest instead.

From the fourteenth century to the Revolution the societies continued to exist with two classes of members, the archers and the crossbowmen, sometimes in harmony and sometimes in discordant struggles for the supremacy of influence for either particular arm. During this time the companies were distinguished by brilliant uniforms, mostly consisting of a scarlet coat with trimmings of other colors, such as a sky-blue lining, black feathers in the hat, gold or yellow waistcoats and so on.

At the Revolution all this was swept away but during the last century the societies were revived or formed anew and their numbers rapidly increased to the great dimensions which I have indicated.

Personally I feel that archery is more strongly intrenched in France than in any other civilized country and the only thing I can think of which I believe would undoubtedly strengthen its position still further would be the adoption of standard targets and ranges and a proper medium for the just comparison of scores and establishment of records of best performances.

As the technical names and words used in archery are hard to find in an ordinary French dictionary I will give a short list of some of the more important ones as a help to anyone who wishes to read or write in that language.

ailé	feathered
un aileron	feather <i>or</i> vane
un arc	bow
" " composé <i>or</i> oriental	composite bow
" " de main	hand-bow
" " démontable	jointed bow
" " doublé	backed bow
" " primitif <i>or</i> simple	self-bow
une archerie ( <i>obsolete</i> )	archery
armer l'arc	draw the bow the length of an arrow
bander l'arc, tendre l'arc	string the bow
le berceau	covered butt
le bois	arrow-shaft
la branche inférieure	lower limb
" " supérieure	upper limb
le brassard	bracer
le but	mark, target
la butte	butt
la butte d'attaque	further butt
la cible	target
le carquois	quiver
chasser bien	to draw sweetly and well (of bows)
la coche	bow-nock
la compagnie	archery society
la corde	string
la cornette	bow-horn
le corps	body of the bow
le coup	shot
" " de broche	centre- ( <i>or</i> pinhole-) shot
décocher	to release (an arrow)
détendre	to unstring
le doigtier	finger-tip
le dos	back
échantillonner	measure (an arrow from the broche <i>or</i> pin-hole)
une empenne	feather
empenné	feathered
un empereur	winner of three straight years
une encoche	arrow-nock
encocher	nock an arrow

encorder ( <i>obsolete</i> )	string the bow
épreuve	round
un étui	bow-case
la face	belly of the bow
la famille ( <i>rare</i> )	association of archery societies near each other
la flèche	arrow
la force (d'un arc)	weight of a bow ( <i>e. g.</i> "un arc de 30 kilos")
fouetter	kick (of a bow)
le fût	arrow-shaft; body of arrow
le gantelet	shooting-glove
le guide-flèche	arrow-rest
la halte	"end" of two arrows at two targets
la hampe	arrow-shaft
le jardin (des archers)	French style shooting ground
le jeu de l'arc	archery
la maitresse butte	butte where the archers stand first
le maquet	blunt shaft for shooting "oiseaux"
un oiseau	popinjay
le papegay	popinjay
la poignée	handle
la pointe armée	point fitted with a pile
" " nue	naked point made by sharpening end of shaft
la reine	championess
le roi	champion <i>or</i> winner
la ronde	union of 20 societies
le talon	"heel", part of arrow behind feathers
tendre	string (a bow)
la tête	pile
la tige	shaft or stave
le tir	act, art, or place of shooting
tirer	shoot
le trait	arrow or bolt (more general than "flèche")
la verge	arrow-shaft

## VIII

### INTERNATIONAL ARCHERY

To be combined in a world-wide federation has for a long time been a dream of toxophilites in Europe and America and the initial step toward that end was taken in 1931 by some archers of Poland. On March twenty-fifth, a committee in Warsaw sent to archery societies everywhere, even to the Wayne Archers, an invitation to join in an international archery tournament to be held at Lwow, or Lemberg, Poland, from August twenty-sixth to September sixth. A tentative program accompanied it that was a curious mixture of various customs of archery and rifle shooting. Probably the latter, especially as a rifle match was to be held at the same time, but another possible source of influence occurs to me.

There is no continuity of traditional archery in Poland, as there is in Belgium, France or England, but it is practically a sport of recent introduction, following its growing popularity in America and other parts of the world. The seal that was stamped on the invitation showed a crossbowman in the act of shooting. In the library of Princeton University there is a large book of photostats of engrossed challenges between the crossbowmen of German cities in the fifteenth and sixteenth centuries. I had it at my home for a good while and worked over the old texts until I finally made out most of the conditions of competition. The distances that were specified were usually from thirty to sixty yards, though occasionally a range would approximate eighty, and the bull's-eye, the size of which was often marked with a compass on the vellum missive, was from four to seven inches in diameter. In many

details, such as the number of contestants and method of counting, there are striking similarities to the Polish archery.

At any rate, they proposed in 1931 that ten men and ten women might shoot for each country but that the scores of only the best three of each team should be counted; that six trial shots might be taken and be distributed at will; that distances, or ranges, might be shot in any order desired; and that an archer should proceed by himself at each target until he was through, a time limit of one hour being allowed for each round.

Twenty-one archers from four countries met at the appointed time and shot off the tournament according to schedule but with many variations from the terms of the original prospectus. For instance the targets which they used were quite different. Instead of the familiar basses of other countries they had great walls of straw bales, three metres square, on which they pinned paper target faces of different sizes and designs, removing one after each end of six shots and replacing it with a fresh one. At thirty metres the diameter was two and a half feet and at forty and fifty it was four feet. The colors were like ours and probably the values of the circles were too, judging from the looks of the scores.

Three events were shot, the first round being thirty-six arrows at fifty metres, twenty-four at forty and twelve at thirty. Michael Sawicki of Poland won with 478. The second round, which conveyed the grandiose title of "Champion of the World, Europe and Poland," consisted of three arrows at fifteen metres shot at a picture of a rooster "of natural size" painted in the centre of a target eighty centimetres in diameter. E. Heilborn of Sweden, who looks like a real archer by his photograph, won this diadem by a hit that was only twenty-nine millimetres from the pin-hole. The third event was a Columbia round, with metres substituted for yards. Each distance had its separate winner, J.

Kurkowska of Poland making 188 at forty metres and Heilborn 164 and 168 at thirty and fifty. The total of the three range scores is 520, which is first class shooting. In fact, those archers must have been pretty good. Heilborn wrote to the secretary of our N. A. A., on another occasion, that he had won the championship of Sweden by a double American round in which each single was just under 600. It is a pity that standard rounds and methods of shooting were not used in this tournament, of such importance in the history of international archery because of being the first.

During the tournament an organization was formed which called itself *la Fédération Internationale de Tir à l'Arc*, abbreviated by initials to F. I. T. A. Colloquially it is pronounced like one word—*Feetah*. Its officers are a president, now Dr. Bronislaw Pierzchala of Warsaw, four vice-presidents from different countries, and a council of six, also from different countries, in which our own was courteously included. Poland, Sweden, France, and Czechoslovakia had competed in the tournament but, in addition, Hungary, Italy and the United States took part in the deliberations, we being represented by Major Boles of Washington, who was present at the rifle match.

The meeting for 1932 was awarded to Sweden, but the committee of that country proved to be unequal to the task, preferring to drop the match entirely rather than to concede the adjustments necessary to secure the coöperation of other countries. Such international claims were, of course, very complex. The French insisted on their conventional rounds of fifty metres and less, while the Poles and Czechs would have liked to see the ranges at least that short, or even with a minimum of fifteen metres. Sweden proposed a round of 75, 50 and 35 metres. England entered into the matter very seriously, even to the creation of the General Committee for International Archery, already mentioned. They maintained that the 100-yard range, or a reasonable equivalent like 90



metres, should be included in any round which pretended to carry with it a genuine championship of the world. They also believed that women should not be obliged to compete on even terms with men, as had been the case at Lemberg. They were willing to agree to such deviations from English custom as a single target line, the use of metres instead of yards, and the reduction of the minimum range for men to forty metres.

Finally, after Sweden's default, the Poles decided to hold the second tournament, that of 1932, in Warsaw; in order to stop the gap and to preserve vitality in the new born F. I. T. A. Early in July the president journeyed from Poland to London in order to confer with English archers and to study their methods. Brigadier General Charles Edward Macquoid, of the Royal Toxophilites, a gentleman of great executive ability, spent a day with him at the club grounds and, as a result, a program was arranged which was not only interesting and practical, but was a fair mutual compromise.

Ranges of 70, 50 and 30 metres, with 30 arrows at each, were to be shot three times, a range a day, for nine days in all. The first two times were for the purpose of enabling all archers, of various national habits, to become used to the conditions. The third time was to count for championships in eight ways: an individual and a team championship for each range, making six titles, and the totals of the three ranges, in what we should call a round, for both individual and team, adding the two more. Each of these eight appears to carry the title of *Champion du Monde* (Champion of the World) for its appropriate range or total of ranges. A shoot at a colored "Royal Cock," of natural size, in a 32 cm. white circle, with fifteen arrows at fifteen yards was to be held on the last, or tenth, day. The winner was to be known as the *Roi ou Reine du Monde* (King or Queen of the World) and the second as *Roi ou Reine de Pologne* (King or Queen of Poland). The targets were practically English; the colors, values and number of rings being the same and the diameter being

120 cm., or 47.24 inches for 50 and 70 metres, but only 80 cm. for 30 metres.

So, we see, a great deal that seems reasonable to us of English leanings was accomplished by the diplomacy of General Macquoid; more than appears on the surface, in fact, as vigorous pressure had been brought to abolish colors, using alternate black and white, to count from one to ten in ten rings and even to have square targets instead of round. Personally, I feel that in making a new target we might as well have one of the best visibility instead of our present fortuitous heirloom, which all physicists agree is about the worst possible. Of course, we who have used it in the past must use it in the future, to keep our records uniform, but what I should like to see adopted for international use is a modification of the target used in the Olympic Games of 1920 at Antwerp. From centre out it is black, white, yellow, light blue and red. In it the bull's-eye stands out clearly, while the order of colors in the other four rings is so altered as to make a deepening intensity toward the edge, a sort of frame for the object which should be hit.

The tournament, as finally held, was a success. There were thirty-two contestants: Belgium, three; Czechoslovakia, three; England, eight; France, four; Poland, thirteen and Sweden, one. The English were led by Lord Revelstoke and General Macquoid; three men and five ladies, one of whom, the present champion Mrs. Louisa Sandford, was second in the 70 metres with a score of 101 against 102 by the winner, a Pole named Zygmunt Lotocki. Thirty arrows were shot at each range. Georges de Rons of Belgium made 222 at 30, which was a fine score on the little target. Another Pole, Janina Kurkowska, won the 50 yard with 168. Poland won all three range championships for teams of three archers. The whole round, as we understand it, was won by Laurent Reith of Belgium with 80, 164, 212; 456, which was good shooting.

At the business meeting, things were all changed again.

It was agreed that while the targets should be of the same size as in the match just ended, each ring should be made half white, circularly, thus forming ten rings, five colored and five white, counting from one to ten, the regular white ring having a line in the middle. The men should have two rounds of the same number of arrows, 132, composed of 84 at 90 metres and 48 at 30, for the first, and 72 at 70 and 60 at 50 for the second. Similarly, the ladies' two rounds should be of 120 arrows each: 96 at 70 and 24 at 30 for one, and 120 at 50 for the other.

Yet all of us know that, sooner or later, the Anglo-Saxon will have his way. Before the end of 1932 the English had agreed to hold the next meeting in England and had stipulated that their standard target of five rings should be used, with a smaller size conceded for the shortest length, and that the Prince's reckoning should prevail. The rounds were brought into general conformity with English usage by making them identical for each day, with specifications for men of 42, 36, 30 and 24 arrows at 90, 70, 50 and 30 metres, respectively, and for women of 60, 48 and 24 arrows at 70, 50 and 30 metres.

This arrangement, I think, will also be quite agreeable to us Americans, not only in principle but in practice, as well, to any who may be fortunate enough to participate in the shooting. Above all, let us not forget the words of the official report of the committee at Warsaw, somewhat quaint in translation, that the "meeting took place in an atmosphere of chivalrous sportive rivalry which was not troubled by any dissonance."

## IX

### HOW TO SHOOT

THERE are probably as many ways of shooting as archers who shoot, because it is impossible to standardize anything done by human beings so that there are no individual differences. Yet, on the other hand, there is no adequate reason why the act should be so uniform as to resemble the perfect drill of a squad of West Point cadets. To enlarge on this comparison, we all know that while the marching, the manual of arms and such things are done with rigorous exactness by well-drilled soldiers, yet when they actually shoot at a target they are allowed great latitude of action to compensate for personal peculiarities.

However, there must be a general standard to be followed, from which slight deviations may be permitted, or else the crude shooting of a beginner would command as much respect as the finished technique of an expert. Every writer on archery has told how to shoot and all accounts have varied. Infinitely the best of all directions are those given by the great Horace A. Ford, who changed the whole basis of shooting and laid down such excellent rules of procedure that scores were doubled and even trebled over what had previously been considered good marksmanship. Yet even from this master of the bow, speaking with great humility, I am forced to differ in a few minor details, and therefore it seems best to me to voice in this chapter exactly my own opinions, backed by many years of experience, in the certain knowledge that if they are rigorously followed in every detail they will lead to a degree of skill of which no one need be ashamed.

I will first give those straightforward directions which the

beginner should learn and then I will enlarge somewhat on the differences of opinion that prevail amongst experts and give some reasons for and against various things.

When Roger Ascham wrote *Toxophilus* he set the fashion for all future writers on archery by dividing the act of shooting with the longbow into five parts, which he called, in the order of their occurrence, Standing, Nocking, Drawing, Holding and Loosing. As each of these is a step which must be mastered separately before the archer can rise to a plane of merit, I will still follow his classic lead. At the same time I will try to present to the novice such other directions that he may know what to do from the moment he steps to the shooting-line until the arrow is quivered in its mark.

First of all he should conform his shooting to the rules laid down in the Constitution of the N. A. A. which requires that prescribed numbers of arrows at specified distances shall be shot, as may be seen in the definition of the word "Round" in the glossary of this book. He should also shoot them in sets of six, called ends, which in competition may be subdivided into two groups of threes, with a rest between.

The six arrows, to be shot at one end, may be carried on the person, in a quiver or trousers pocket, or they may be stood on the ground in front of the archer in some kind of receptacle. Never lay them on the ground or put them in any place so far away that to get them necessitates a change of position.

To *string the bow*, grasp its handle with the left hand, the back of the bow being uppermost, and place the lower end, just above the tip, against the hollow of the left foot. Place the "heel" of the right hand against the upper end of the bow, below the eye of the string, and take the eye lightly between the thumb and forefinger. Then, holding the left hand steady, push hard with the right, letting it slide toward the nock and carrying the eye up till it falls into its groove. All pressure should be exerted on the bow, not on the string. To *unstring*

the bow, bend it in the same way and pick the string out, lightly, with the first finger.

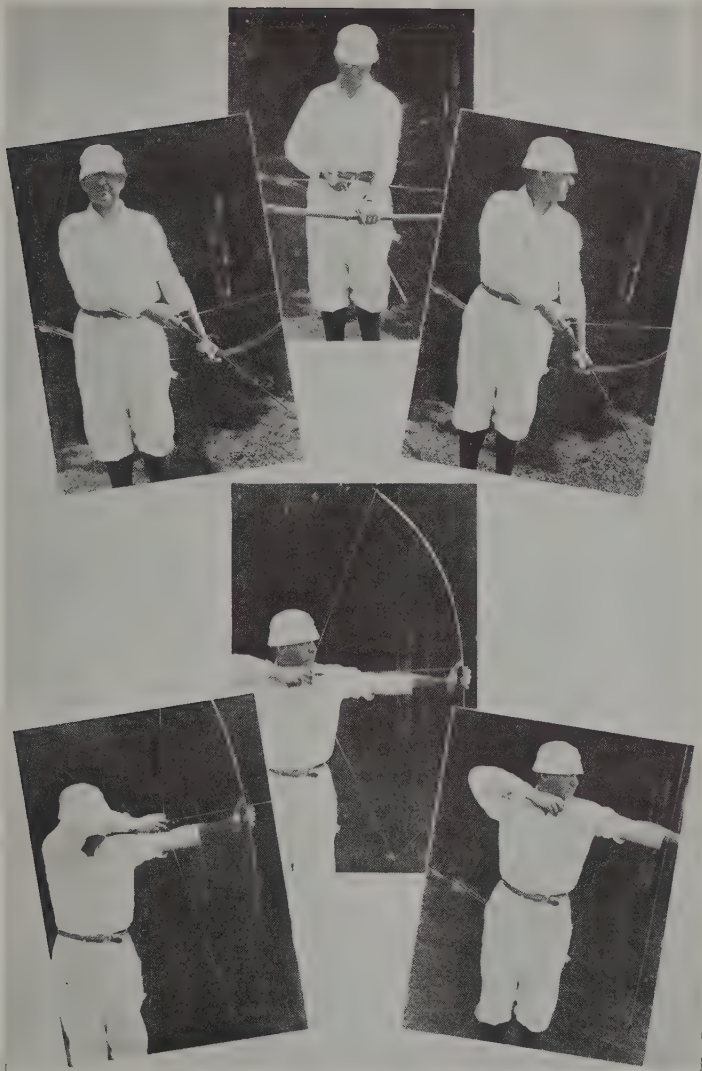
The correct *stand* is very important. In archery one does not toe the mark, he straddles it. The heels should be about nine inches apart in the line the arrow is to follow, the archer, therefore, standing with his left side toward the target. The feet may be either in their natural position, as most of us prefer, or, as taught by Dr. Weston, the left foot may be at right angles to the line of the heels and the right foot point about forty-five degrees backward. The weight should be borne evenly by both feet.

The body should be perfectly erect.

The position of the head must vary somewhat with the individual. Classically, it should first be erect, as with a soldier at "Attention," and then turned sharply to the left so that the target is seen over the left shoulder. Yet for some people it is necessary to crane the neck, or tilt the head slightly, in order to provide for two essentials in archery, one that the nock of the arrow be vertically under the right eye, and the other that there be a clear way for the string. Many archers, especially ladies, find that in the orthodox position the string hits the left arm, elbow, shoulder or chest, causing great pain and ruining the shot. Such people must hold the shoulder well down and back and sometimes must even face slightly toward the target, changing the position of the feet accordingly.

To *nock* the arrow, grasp the bow-handle exactly as it will be held in shooting, the hand being even with the top of the handle, and hold the bow horizontal, with the back of the hand up. Take the arrow by the nock, with the thumb and forefinger, and lay it on the bow, just touching the hand. Then fit it to the string, with the cock-feather up, at exactly right angles, remembering that this relation is to the string and not to the bow, which may be crooked. During this operation the arrow may be steadied by the left forefinger, but it is not at all necessary to do so.





ROBERT P. ELMER

SETTLING THE HANDS  
BEGINNING THE DRAW

NOCKING ARROW  
FULL DRAW

HEAD TURNED  
AFTER LOOSING



To *draw* the bow, hook the first three fingers under the string (the bow still being horizontal), with the arrow between the first and second, so that the string rests on the middle of the pads of the first joints. Then swing the bow, with one hand holding the grip and the other on the string, around to the left side of the body, close to the hip, so that the left arm hangs straight down. From this position of rest raise the left arm stiffly, with elbow locked, straight away from the body, like a pump-handle, till the left hand is level with the chin. In so doing it is necessary either to draw the arrow a few inches or to advance the right shoulder a little as one may prefer.

Regarding the grip on the bow-handle there is a difference of opinion. Before the first publication of this book every writer said that it should be grasped with all of one's strength. I think I was the first to advocate a loose grip of the fingers, but with arm and wrist as stiff as steel. The reason is derived from the fact, proven by experiments which will be described later, that an arrow in passing the bow should push it a fraction of an inch to the right and, obviously, this can be done more freely when the grip is loose than when it is tight.

After thus elevating the bow the arrow must be aligned exactly with the centre of the gold and in drawing it must be kept in that line during the whole operation. This drawing of the string should be quickly done, so as to save one's strength for the aiming, and should be so complete that the pile rests on the left hand. At every shot, no matter at what distance from the target, the arrow must be drawn to its full length and held there until loosed, without being allowed to creep forward so much as an eighth of an inch.

While drawing, the elbow of the drawing arm must be kept free from the body and fully as high as the hand. This allows the powerful muscles of the shoulder and shoulder-blade to do most of the pulling and makes one feel that he lays his body into the bow, as Bishop Hugh Latimer expressed it. The

hand must follow in the line of the arrow, bending sharply from the forearm at the wrist.

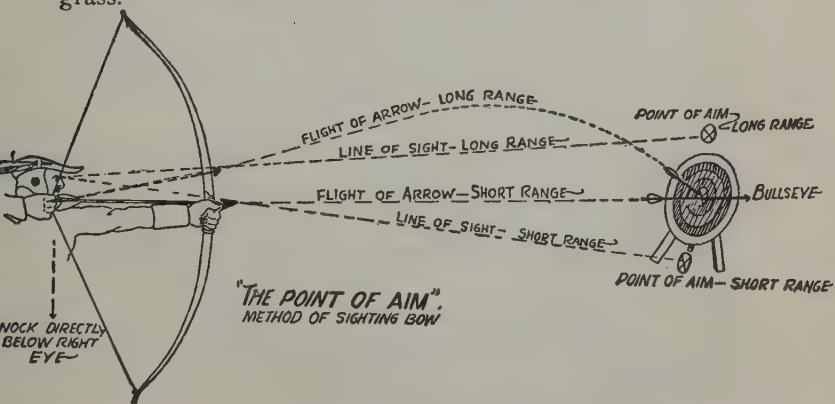
The most difficult thing in aiming and, indeed, in all archery, is the control of the nock end of the arrow. The tip can be seen and its position accurately adjusted, but the rear end, which is just as important, must be controlled entirely by touch. Every beginner, practically without exception, shoots to the left of the target for the reason that while he carefully sights the tip, as he would a gun, he invariably draws the nock to his cheek, ear, or some indefinite point in the air which is to the right of the eye, thus throwing the arrow out of a straight line from his eye to the target. It is therefore obvious that the drawing point, or place where the nock rests while aiming, must be somewhere in the vertical plane which bisects the eye and the centre of the target. Thus some archers draw to the angle of the jaw, some to the corner of the mouth, some to a tooth (felt through the lip), some to a point to the right of the Adam's Apple and some to the end of the collar-bone, but everyone who wishes to shoot well must find some part of his facial or cervical anatomy in the line below the right eye to which he can always draw the nock with unfailing precision.

When the shaft is fully drawn the right hand must be held immovably fixed, because the least relaxation will permit a slight creeping of the arrow with a consequent shortening of the cast. It therefore follows that all variations in aim must be made by altering the position of the left hand in either horizontal or vertical directions.

The proper alignment of the arrow gives true direction and is comparatively easily obtained by sighting along the length of the shaft as one would sight a gun barrel. By vertical alterations, raising or lowering the bow-hand, one arrives at the correct elevation. An archer is much like a gunner with no rear sight, he has to raise or lower his front sight, the only one he has, by relating it to some object seen in the distance. Thus, if he be shooting at as great a distance as 100 yards he must

select a tree, cloud or house which happens to stand behind the target and aim at some point in it that his judgment suggests is of the right height. This spot which he selects is called the *point of aim*, a name and principle which, although it has doubtless been used more or less for untold ages, was first clearly defined and its importance insisted upon by the great Horace Ford.

So far the idea of a point of aim higher than the target is grasped with ease by all beginners but they do not so readily understand that when the range is sixty yards or less, for the bow of average strength, the point of aim is below the target on the ground. It is easy to see why this is so. If the arrow were drawn to the eye every point of aim would be above the target but, in fact, the nock is usually about six inches lower than the eye. Therefore, to raise the tip even as high as the line of sight from the eye to the target would mean a rise of six inches in twenty-eight, an inclination which would send the shaft very much too high. Anything less would mean that the sight must be directed somewhat downward and therefore would fall on the ground, in which case the point of aim must be some such thing as a bare spot of earth, a daisy or a tuft of grass.



Courtesy of the Archers Company.

When the approximately correct place for the point of aim is determined upon the arrow is loosed and if the judgment of the archer and all other factors be correct it will fly accurately to the mark. If the arrow go too low something higher must be selected as the point of aim and if it go too high something lower until the exactly correct point is found.

Authorities differ as to whether the primary vision should be centered on the target, with the point of aim seen vaguely by indirect vision, or whether the sight should be focused rigidly on the point of aim with the target seen indistinctly, if at all. Probably either way is right if it be rigidly adhered to and the archer do not let his eye wander.

*Holding* is really a part of aiming. It refers to the time in which an arrow is held motionless just prior to the moment of flight, when that final coördination of eye and muscle is effected which is the acme of refined technique. Roger Ascham taught that this moment should be so brief as to be "better perceived in the mind than seen with the eye." Nevertheless, I have noticed that all the best shots in this country hold until they are perfectly certain that their aim is accurate and that all else is as it should be. In this connection I would say that a valuable, but difficult, thing to learn is to relax the string without loosing the arrow and begin the shot again when one feels that something is wrong. The frequent remark, "I knew that was not right before I shot it," is a reproach to the archer.

If the archer has assumed the correct initial position, has turned his head sharply to the left and has nocked, drawn, aimed and held his arrow precisely as he has been directed to do he is now ready for the final act which frees the shaft from his control and leaves it to be guided only by the laws of physics. Of all things in the art of shooting *loosing* is the most important. Without a good loose all that has been done before counts for naught. I emphasize this particularly because most beginners seem to think that the aim is everything,



forgetting that the flight of the arrow depends wholly on its position and treatment at the moment when it is freed from human control, both as to its position and to the propulsive force behind it, and that these factors may be ruined by the slightest side pull or sluggishness in loosing.

To secure a good loose remember that the string must be borne on the first pad of each finger and never hooked in the joint. Furthermore, the weight of the pull must be even on each finger. Usually the third finger has a tendency to carry most of the strain and the second much less, while the first finger takes up its share of the burden so reluctantly that it has been nicknamed, by Will Thompson, "The Shirking First."

The ideal loose is the one that liberates the string with a minimum of disturbance and retains the full tension of the bow up to the very last. It cannot be obtained by plucking the fingers off the string, as a harper twangs his instrument, because that would disconcert the aim. Neither will it suffice simply to open the fingers and let the string escape, for then the cast of the bow is lessened.

The best way is to increase the effort of the drawing arm while the fingers either slightly relax or, as seems better with some archers, remain at the same tension. In either case the greater pressure of the cord will pull it suddenly off the fingers, all three of which it must quit at the same instant and without jar or jerk.

It seems to me that Ascham should have added to his description of shooting a sixth division which he might have called *pausing*, for, after the string has left the hand, the archer must stand for a moment like a statue, in the exact pose which he held at the instant of loosing. Otherwise he will find it impossible to keep the muscles at precisely the same tension while the arrow is crossing the bow. The left hand must not drop an iota and the right hand must remain resting firmly against the spot it has been drawn to. The best index

at this time is the right elbow; if it has not dropped even a small fraction of an inch the loose will probably have been a good one.

Here I would say that in no sport is the need of exactness in detail greater than it is in archery and also, that the practice which leads to virtuosity consists not so much in mere frequency of shooting as in the careful study of every shaft that is sped.

Thus endeth the first lesson; infinitely the most important one. Many archers have followed the directions just given and some have become experts of the first rank, taking the highest honors in competition. Yet there is much more that may be said.

When taking your stand to shoot be sure to choose the best place for your feet. If you are at a tournament where the ground is full of pegs to mark the positions of the targets at the different ranges, stand exactly in line with those that lead to your target, as they greatly assist the eye in forming a true line. If there be no guide of this sort, choose a spot on which you feel firm and comfortable. It is astonishing what a difference a good firm footing makes. Of course if there be a very good object in the proper place for a point of aim, such as a telegraph pole for the long ranges or a bright flower for a short one, it is only common sense to move about until you can take the best advantage of it. When you have once found the right place be certain that you return to it exactly the next time and that you do so with both feet, having them just as they were before, because the slightest turning of your body will make a difference in your aim. I usually note the weeds or blades of grass against which my toes touch, or on bare ground I trace the prints of my shoes with an arrow and step into them for the succeeding ends.

Before drawing make sure that you are not muscle-bound or stiff. It is a good thing to rock a little on your feet and wobble a little in your joints before making the supreme effort.

An effort it is to shoot and a very great one if the act is to get the best results. While it is being performed one should stiffen his legs, take a full breath and hold it so as to set his diaphragm and thorax, stiffen his belly, set his neck and clench his teeth. Sometimes, for some peculiar reason, probably fatigue, this can be overdone and if an archer find that he is going bad in his shooting he can change to the better by relaxing himself and shooting a few arrows with a sensation of partially taking it easy.

When you come up to the shooting line after having rested while the others are shooting, give a pull or two on your bow to be sure that your muscles are not stiff or cramped. I have always done better when I have been careful to take this precaution.

After having taken your position nock your arrow in a careful and leisurely manner. Some men whip a shaft out of the quiver and adjust it rapidly to the string as though they were meeting the charge of a wild beast. For this there is no reason at all. You have plenty of time to put on the arrow with exact care, making yourself satisfied that the nocking point and the top of your bow-hand are properly aligned with each other. I do not approve of making a small bead of wrapped thread on either side of the nocking point, as many archers do, because if the string stretch in the least or if there be any slipping at the loop the nocking point will be thrown a little out of its true position. I think the best way is to take a square score-card, or anything else that will give a perfect right angle, lay one edge on the string, while the bow is rested on your lap, so that the edge at right angles crosses the arrow plate and then mark the nocking point which is thus indicated on the string with a drop of ink from a fountain pen. Some archers wind a little fine silk thread, of scarlet or any other bright color, about the point. This is a good way too and helps to preserve the whipping but it has to be frequently renewed.

When the arrow is carefully nocked, raise your head, look straight before you and then swing the bow around to your left side. Here you must carefully adjust both hands by the sense of feeling only, without looking at them; personally I find that I often do this best with my eyes shut.

The bow-hand must be well settled to the grip. There are several different ways of holding a bow, all of which have certain things in their favor and consequently have vigorous partisans.

The most natural way, which is also the oldest and the one almost invariably taught in the books, is to grasp the handle with your strongest grip as you would any bar which you meant to squeeze. In this way the thumb and first finger encircle the handle and for bows of ordinary size the thumb overlaps the finger somewhat where they meet. Although this grip is favored by many archers of the highest skill it is not the one I like best. With it the pressure of the bow is borne on both the thenar and hypothenar eminences of the palm, though principally on the former, and therefore the wrist is turned sharply upward.

The second style of holding, which numbers at least one former national champion among its advocates, consists in encircling the handle with the thumb and first finger but at the same time keeping the wrist straight, so that the bow really rests in the hammock between those two digits. It does not give the broad base of support that the full palm does and therefore with a very strong bow the wrist is liable to crumple. If the archer be strong enough to stand the strain with certainty or if he use a weak bow, not over forty-six pounds for most men, he can do excellent work with this grip. It gives the longest possible draw, because the arm is extended to its fullest extent and it supports the bow exactly behind its centre of gravity.

The third method, which I usually employ myself, is very much like the first except for two things, one that the thumb



"MOVIES"





is extended either straight up the belly or very nearly so and the other that the grip is decidedly loose.

I do not by any means insist that the thumb should be held up the belly of the bow; in fact I am not at all certain that it is the better way. All I can say is that in my own case I feel that it is more comfortable, keeps the wrist well out of the way of the string, allows the handle to rest firmly on the thenar eminence, or ball of the thumb, and gives me a feeling of control over the bow.

To show how the opinions of different archers vary on such matters as this I will quote a paragraph from Ford which gives a diametrically opposite view: "Some archers have a habit of letting the thumb of the left hand lie extended along the belly of the bow, whilst others extend the forefinger, apparently to keep the arrow in its place. Both these habits are bad, as tending to weaken and unsteady the grasp, and as causing the jar of the bow to be more sensibly felt." I agree with the great master whole-heartedly as regards the pernicious habit of extending the left forefinger.

The question of whether to hold the bow with a firm grip or with a loose one will probably never be settled. In fact I should say at once that while I usually employ the loose grip I will sometimes use a tight one for a few shots in order to change my form when in a slump.

This is the second time I have mentioned changing one's style to get out of what we call a slump and the English call the rots. As a matter of fact it is very advisable that an archer have two ways of doing almost every act in archery, a best one and a substitute, for a sudden change of style will often prove his only means of salvation in an unfavorable emergency.

One reason for a loose grip is that with it an archer cannot so easily throw his bow out of line by a jerk of the muscles. To understand the second reason we must consider what is known to archers as the Archers' Paradox. A paradox is

something which at first view appears absurd but which on investigation proves to be well-founded.

The whole trouble is that the bow is wider than the string. For this reason an arrow at full draw will form a very sharp angle with a line from the string to the centre of the belly of the bow and as the string is slowly let down this angle will become greater and greater. In fact I have taken some measures on my own range to see where the arrow in an undrawn bow would point, at sixty yards, if the string and centre of the belly be in the line to the gold and I find it to be just about fourteen feet to the left. Of course the wider the bow and the lower it is strung the greater this distance would be. Why then is it, when an arrow is thus deviated to the left during the whole time that the string is still in its nock, that it will fly away from the bow directly toward the mark rather than fly off somewhere to the left? Ford was the first writer to work on this problem, so far as I know, and it was taken up later by Butt, who edited an edition of Ford, and by Colonel Walrond in *Badminton*. These gentlemen give partially correct explanations which quite properly take into account the effects of strain and counter-strain on the arrow due to its inertia and consequent pressure against the bow but none of them note the fact that by this very inertia which, on calculation, is found to be quite a force, the arrow literally pushes the bow out of its way.

This is not such a big thing as it sounds. It takes very little force to move an archer's arm sideways; even a slight puff of wind will do it, and the distance to be moved is not nearly half the width of the bow. It would only be this much if the string touched the belly. With the string a fistmele high and considering that the true plane of the bow is always to the right of the arrow, from the beginning of the act of shooting till the end, I do not believe that the bow has to be moved over more than the thickness of an arrow shaft. Suppose, instead of the bow moving away from the arrow it merely twisted a

little in the hand; would not the effect on the arrow be the same as regards the direction of its course? That the bow moves I proved to my own satisfaction by two series of experiments in 1913 and 1926, which will be described later and which I hope will convince you also that my conclusions represent the truth.

I think that the result of these experiments suggests pretty clearly why I find it better to shoot with the loose grip. It is simply to make the course of nature run as smoothly as possible and to allow the bow to move sideways for its fraction of an inch with as little resistance as may be.

When I thus explain the matter to most people, even to archers who are not familiar with it, they do not grasp what I mean at all. They seem to think that I let my bow wobble about in my hand in a most uncertain fashion, whereas nothing can really be further from the truth, as any of my friends can testify. Everything else about the archer is stiff as steel except only the fingers of the bow-hand.

Returning from this important digression I believe we left the archer standing with his feet placed, his body straight and his head erect, looking forward. His bow was at his left side and his bow-hand was adjusted rather loosely to the grip. It remains now to consider the position on the string of his drawing hand, which for most people is of course the right.

There are a great many different kinds of draws practiced by the various tribes of the earth, as I have described, but for our kind of archery only two are satisfactory. I will speak of the unusual one first, to get it out of the way. So far as I know, it is used only by a few archers of the Pacific coast, including Arthur Young and Donnan Smith, who learned it from Compton, who in turn learned it from the Sioux Indians when he was a boy. It is therefore called the Sioux draw and consists in using all four fingers on the string with the arrow placed above them, lightly touched by the thumb. Young and Compton have done magnificent work with it in the face of

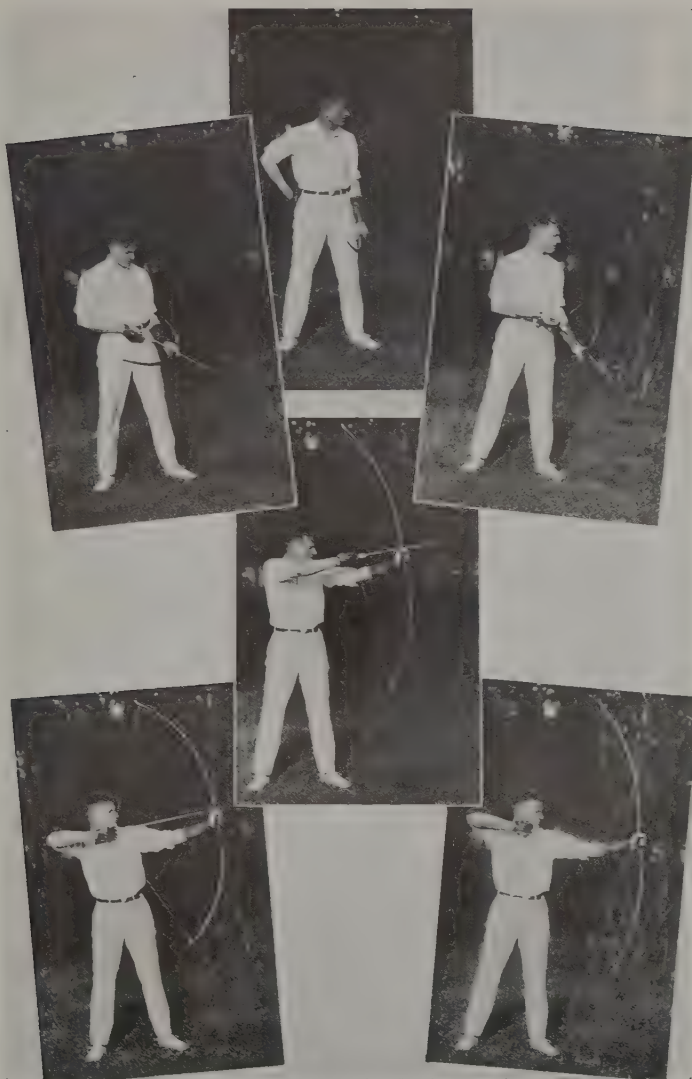
mortal danger, so it is not for me to criticise it adversely when I know so little about it. Pope used it in his Hiawatha stunt but not in regular shooting.

The draw which has been used in Europe from time out of mind and which every other archer of a white complexion, excepting a very few, uses to-day is with either two or three fingers. In the Bayeux Tapestry and other ancient drawings the two-fingered draw is, pictorially, the one employed, and many continental archers use it still. Some English and Americans also prefer it, including the British championess for 1914 and the American champion of 1903. It would undoubtedly be better than the three-fingered draw, at least theoretically, if it were not for the question of strength. To pull a heavy bow through a long round needs all the endurance in the muscles of the hand that can be brought into play and the two-fingered archer is more apt to succumb than his three-fingered confrère. In the continental style of shooting one arrow at a time this factor is not of so much importance.

Nearly all archers keep the tips of the first three fingers on an even line with each other, and lay the string straight across them. I used to think I did the same, but my friend Palmer pointed out to me that I did not. It is queer how one will have a peculiarity and not know it. What I do is to extend the second finger about half an inch beyond the first and the third a little farther yet, so that the string lies very obliquely across them. In the act of shooting this makes the back of the hand be uppermost, where it can be tucked under the ramus of the jaw, and it permits the string to be very smoothly loosed by rolling off the sides of the ends of the fingers rather than off their very tips. It also gives a somewhat lower drawing point because the fingers are bent downward.

This is the position of the fingers which I recommend to all those whose physical configuration makes it possible.

Now while this adjustment of the two hands should be done by the expert archer through his sense of feeling only, it is



PAUL W. CROUCH

TAKING ARROW FROM POCKET

LOOKING AT TARGET

NOCKING

BEGINNING DRAW

AFTER LOOSING

FULL DRAW





not to be supposed that the beginner can do it that way. He must of course look at his hands hard and often until the movements become practically automatic.

The next act is to turn the head sharply to the left so as to look straight at the target. Do not give a half-turn, as most people do, and squint at the gold out of the corner of your eyes, but turn the head squarely about, without moving the body, as though your neck were made of rubber, and keep the head rigidly there during the subsequent acts of drawing and loosing.

It is very difficult to keep the head in one place but when it is remembered that the whole position of the arrow depends on its nock being always in exactly the same spot it is easy to realize that the slightest tilting of the chin either up or down will change the elevation and any rotation will cause a lateral error.

In shooting the bow, as in shooting a gun, some close one eye and some keep both eyes open. It is a question which is suitable for debate and the answer is not the same for every individual. In general the binocular vision is best because it permits a more accurate estimation of distance. In hunting and roving, where the exact ranges are never known it should invariably be used. For 100-yard shooting it is also unquestionably the best. Personally I use it practically always at every range down to sixty yards, but below that, at fifty and forty, I often shut my left eye. The reason is that there is no need at this short distance for doing anything more as regards aiming, or sighting, than accurately and rigidly fixing the tip of the pile on the point of aim and this may possibly be done more infallibly if the left eye cannot interfere. I will quote in illustration an instance that occurred to me at one of the most critical moments of my life. In the championship match of 1925 Dr. Crouch and I were exactly even when we had finished both Yorks, the first American and the sixty, fifty and part of the forty of the last American, or final round. It

was a moment of high tension. On the third end Dr. Crouch made five golds and a red, 6-52, while I made only 6-42. My only hope, therefore, was to equal his performance on my next end. The first three were golds and I had some hope of succeeding, but when I came up for my second three I caught the sight out of the wrong eye and the arrow flew wide off the target to the left. The two remaining arrows were a gold and a red, but that shaft that went wide took all my chances with it. I tell this because here was a case where one who was old enough to know better had not sense enough to wink the left eye before he loosed the shaft.

Even if you do let both eyes be open be certain to assure yourself that it is the right eye which is doing the work by frequently winking the left as you aim. Sometimes the arrow will lie between both eyes and the left will draw it only a little out of line, or some archers even prefer to sight with the arrow between the two parallel lines of vision. I used that method myself for several years. After all each man must be a law to himself.

There is an artificial assistance to the eyesight in shooting which has been invented and perfected by McMeen and which he has found to work very well. It consists of a special pair of spectacles so arranged that the right eye focusses at twenty-eight inches and the left at infinity. By such a contrivance both the tip of the arrow and the target stand out with startling distinctness. I have never tried any device of this sort, as my eyes focus well enough naturally, but there is no doubt that for certain cases of poor ocular accommodation it has a real value. The glasses are worn only while in the act of shooting, as of course such spectacles would prove very trying to the eyes at any other time.

Bring the arm up sharply, as I said earlier in this chapter, with the elbow LOCKED. I print that word large because it is what I mean. Every other writer tells you to let the elbow of the bow-hand be comfortably loose, as otherwise the jar of

the bow will soon bring on an inflammation of the joint. I do not think this is so, or at least it is rare enough to be negligible, and I can assert positively that without a firm elbow no one will ever reach to the greatest heights.

Some men, including Dr. Crouch, draw the bow on the way up. I have made some of my best scores in that way too. It is undoubtedly a perfectly good way to shoot. Yet I think it is even better to first elevate the bow-arm and then draw the arrow back exactly in line with the target. Palmer shoots this way. Here again it is well to have control of the two methods. For example, in the annual Eastern tournament of 1925 I shot in the latter way through the first York and through the first American to the third end of the forty yards. For the first and second ends I had made miserable scores in the 30's and was in very low spirits. By then changing to the former method, of drawing as I lifted the bow, I made a fifty, and finished strongly. Furthermore by continuing to shoot in that way through the second York I managed to win it with a new record and the best 80-yard score I ever made in public. Yet in the second American I had to go back to the draw-in-line and in the national tournament, later in the summer, I used it almost exclusively, getting very discouraging results if ever I tried to change.

It was Harry Richardson who told me to draw quickly and save my strength for the holding and aiming, and I have always felt thankful for the advice. I am glad to have this opportunity to pass it on. Richardson always drew the arrow much higher than the point of aim and lowered down to it, very much as a pistol-shot will bring his weapon down to the mark. I have always preferred the opposite way of drawing too low and coming up and I think it is better because you can more easily keep the range in view during the act. Do not begin to draw with the arrow pointing way down to your feet, as your arm will get tired and seem to stick in its socket on the way up, but draw just about parallel to the earth and then

raise the arrow slowly but firmly till it is on the exact point of aim.

It is during this last rise of the arm that one is apt to creep. The only way to avoid it is to keep the left arm as hard as I have described and to particularly remember to pull extra strongly with the drawing arm during that brief space of time.

Practically every beginner is very much annoyed in his early attempts at drawing by having the arrow persistently fall off the bow-hand. When he asks an older archer how to correct the fault he is usually told that if he persist in shooting it will remedy itself. While this may be true one might as well know what causes the arrow to drop away to the left and he can at once do away with the source of the trouble. There are really two chief reasons. The first is that in spite of all instruction to the contrary the grasping habit of a lifetime makes one press upon the nock end of the arrow with his thumb. The second is that in the effort of drawing, which closely resembles any other pulling movement, it is natural to clasp the hand continually tighter by closing the fingers, and, as the arrow is held between the first and second, it is thrown by them in the same direction as they contract. The easiest way to cure this tendency is to start the draw with the fingers already so far bent that they will automatically be straightened out by the strong pull of the arm and thus force the arrow against the bow.

The location of the drawing point is naturally high in archers who specialize at the short ranges, like the French, and low in those who habitually shoot at 100 yards or more like the English and Scotch. If one shoot at something so near that the arrow has an almost flat trajectory it is advantageous to draw almost up to the eye. In this category I would include trick shooting on a stage, or at small objects near at hand, and shooting at birds and squirrels in trees. I have been told, though not with particular authority, that it was by using this

very high draw that Mr. Maurice Thompson made his astounding records of breaking 38 glass balls in public and 46 in private out of 50 thrown up at 12 yards distance. I do not think Buffalo Bill could do any better than this with his rifle, at least not when I saw him.

Maxson made some excellent scores at the American round and none at the York that were worth mentioning. As might be expected, therefore, his draw was very high, fully as high as the corner of his mouth, as he showed it to me, so that his point of aim was on the target at 60 yards, giving him the same advantage that a peep-sight does the modern archer of lower draw.

If, therefore, the archer be a lady who never expects to shoot any distance beyond the 60 yards of the National, or a man who never intends to enjoy the delights of the York round, I advise her, or possibly him, to draw high. Mrs. M. C. Howell drew on her chin, not below it, I should think about to the root of the right lower canine tooth.

For all men who wish to strike a happy medium which will be high enough to make the American round a thing of pleasure and yet allow them to shoot at 100 yards without having to search the blue vaults of Heaven for a point of aim I advise the draw just below the jaw-bone, or in reality to the region of the neck, which I have already described.

There are different ways of finding a place which one can be sure to reach for every shaft. I always try to draw my hand lower than my jaw-bone and then come up against it from below with a thump, thus making sure that my hand is not sneaking up farther than it should. When I do it properly the third knuckle of my first finger touches the angle of my jaw-bone.

Phil Bryant used his thumb as a guide. At the end of each draw he would stick his thumb straight up and rest it in the little hollow under the ear. This is a good way if the thumb be used only as an indicator but one is tempted to press



with it against the bone to keep from creeping and then the elevation is ruined.

Whether or not Will Thompson drew very high when he was a young hunter, shooting at small birds on near-by boughs, I do not know, but I have photographic proof that in 1882 at 100 yards his hand was as low as his necktie, the arrow-nock being a good two inches below his chin. He used this same draw when I shot with him in 1913 and had taught it to Dr. Doughty, who won the championship in that year. It gave him a point of aim about two-thirds of the way to the target at 100 yards, about where most archers would find it for 60 yards, but, as he laughingly expressed it, his point for 40 yards was on the tip of his toe. Mr. Taylor, at least of late years when he has specialized at the York round, also draws almost as low as that.

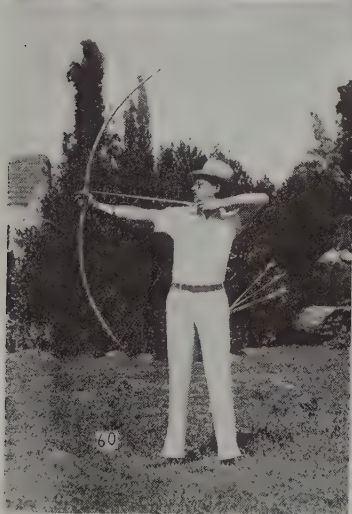
For such a low draw it is hard to find a definite place to tie to. I have been told that Will Thompson experimented with a button sewed on the lapel of his coat but did not find it reliable. The only guide, besides one's general sense of judgment, seems to be to touch something like the larynx or collar-bone with the thumb. For overhand shooting at the clout the very low draw is a necessity but for underhand shooting it does not make much difference.

After drawing comes aiming, then loosing, which I have described, then pausing, or holding oneself rigid until the arrow has either struck the mark, at the short distances, or is well on its way down the range at the long.

This completes the whole act of shooting, but I must enlarge somewhat on the subject of aiming.

Before the time of Ford the accepted teaching was that the archer should centre his gaze on the gold and forget all else, relying solely on his judgment, as influenced by his sense of poise, to carry the shaft as it should go, or, in the language of that time, to keep a length. Ford, as I have said, perfected the use of the point of aim, so that he may be said to have





DR. ROBERTS

NOCKING  
LOOSING

SETTLING  
PAUSING



practically invented it, and all good archers have used it ever since. Of the two ways of using the point, whether by direct or indirect vision, I prefer the former, probably because I learned to shoot in that way from the written instructions of Dr. Weston. I can always make my best scores if I stare hard at the blade of grass which for the time being is of such precious value and see the target, if at all, very dimly in a sort of haze. Yet Professor Rendtorff, a giant of the days before the war, never let his eye wander from the gold and the great Dr. Roberts fixes his vision on the centre at the three shorter ranges but on the point of aim at 80 and 100. On the other hand Hoogerhyde told me that he looked steadfastly at the point at every distance.

Perhaps I should have said before that the archer raises or lowers to the point of aim to straighten out any mistake of direction which he might accidentally have made if he drew directly to it.

Now this is as far as one can go in learning to shoot by the methods of pure archery and it is the place where, in my opinion, all efforts to increase accuracy by the use of extraneous devices should stop. Yet, even though we all know that archery attracts us as it does because of its elemental simplicity, it is difficult for us to refrain from attempting to better our scores by the addition of various devices which suggest themselves to our modern sophistication.

The first of these was probably an artificial point of aim, which is made by sticking some easily visible object into the ground at the proper place rather than relying on whatever Nature has put there. When I first shot in the national tournaments, and for all the time before that, the use of any such trick was strictly forbidden, so that comparison of all the scores made during those thirty odd years is strictly fair. After the war the practice was permitted by the authorities governing the tournaments, although it had been more or less winked at in the case of certain archers with poor eyesight for

a year or two before. Personally, I am strongly opposed to their use but in that opinion I run counter to the great majority, and I must confess that under the pressure of competition I have fallen from grace and used them too. In 1931 they were sanctioned by official vote, the by-law governing their use specifying that they should not be more than six inches in height and that no marks should be made on the target nor raised above it. At present, a shooting field is usually dotted with dozens of the brightly colored little balls, rods, paper discs and the like.

A device which some use, myself included, to assist in finding the point of aim at a strange target might possibly be classed as an adventitious aid. So far as I know it owes its existence to the fertile resourcefulness of Wallace Bryant. You probably have all noticed that artists, in painting, often hold up a brush or pencil at arm's length and measure off on it the size which the object of their scrutiny would assume at that degree of foreshortening. Applying this method to the range Mr. Bryant took a measure from one target, on which he had been shooting and where the range was known, and transferred it to a new target, thus starting to shoot with a point of aim that was practically predetermined. The operation is very simple: hold an arrow upright at arm's length, bring the tip in line with the bull's-eye and slide your finger up the shaft till it is lined with the point of aim. Then walk to the new target, hold the arrow out again and by sighting over the finger see where the point of aim should be. Many archers use this at the present time. I have found that all error is avoided by using a short stick instead of the arrow and marking the distances with a pencil and by resting the stick exactly 28 inches from your face, instead of holding it at arm's length, by interposing an arrow between.

For shooting at 100 yards one should use a heavy bow which will give a low point of aim, but many men are not physically strong enough to do this and many others cannot

secure bows of adequate cast. For them a mark upon the arrow about eight inches from the tip is very useful, the archer sighting by it instead of by the tip and thereby greatly lowering his point of aim. To do this requires considerable practice, because the bow-hand is between the right eye and the target; yet by paralyzing ocular accommodation, or in other words by looking at the distant target but not at the close ring, it will be found that both the target and the ring can be seen at the same time and accurately adjusted toward each other. This presupposes eyes of normal muscle balance, for of course neither cross-eyes nor wall-eyes would do it. I used this method of sighting in '16, '19 and '20, and in two of them I made double Yorks of more than 1,000. Yet I much prefer to shoot without rings and have done so ever since. While I say "rings" from habit it is not at all necessary to encircle the arrow with the mark, as only the top is seen. A spot will do quite as well. I have been told that a famous English champion used such marks, but as he is now dead and my source of information was not beyond question, I will not give his name. I got the idea from noticing that some arrows used by Wallace Bryant which he had sold to a friend were marked in this way. Bryant was an inventive genius.

Another way of aiming at the long distances is by the use of a peep-sight on the string. The first one of which I can find mention in America was used by two gentlemen in Chicago in 1880 and was described in *The Bicycling World* of June 26th of that year. They had both been poor shots but with this sight they beat everyone else. The inventor, "although an indifferent shot, made on the 26th of May last 886 at the double York Round;" a splendid score for those days. The sight was thus described:

"Not larger than a dime, with an ingenious little screw clamp attachment, this peep-sight may be affixed to the bow-string, and adjusted to any point upon it, so that when the

string is drawn the archer may look through a small hole in the centre of the sight across the pile of his arrow at the target and thus get not only a correct aim sidewise but also a correct aim for elevation."

At the national tournament of that year at Buffalo a man named Burnam came with such a sight on his bow. I have heard it said that Peddinghaus, who beat Thompson for the championship with his last arrow, used a sight, but that is not true. *The Archery World* for July 24th, 1880, describes it all in full. Here are some excerpts:

"The peep-sight excited considerable controversy, and, while the majority would like to have seen Mr. Burnam use it once, there was a general feeling that it was not archery to use it, and that it should not be allowed.

"Mr. Burnam declared that he could do little without it, but concluded to try and on the first day he led Mr. Thompson at the 100 range; also, in total, for 100 and 80 yards. He shot in the same manner as with the peep-sight, using marks on the string to sight with over the point of the arrow at the gold.

"The archery peep-sight is simply a round piece of thin brass, about the size of a silver three-cent piece, fastened to a grooved wire, which clasps the bowstring and may be moved up or down. Through the centre is a small hole through which the sight is taken, bringing the point of the arrow to bear on the gold. For long range the sight is moved up on the string; a light bow is used, which can be held full-drawn and steady while the sight is being taken.

"Mrs. Brown, the lady champion of last year, who had been using the peep-sight and was intending to do so, was not so fortunate."

While a peep-sight on the string is valuable when the point of aim is above the target the conditions are reversed when the point is below the target and the peep-sight must then be placed on the bow. This is of course of an entirely different





# RUSSELL HOOGERHYDE

BRACING  
BEGINNING DRAW  
LOOSED

NOCKING  
DRAWING  
AIMING

SETTLING  
FULLY DRAWN  
LOOSED



nature. Nearly all beginners conceive of the idea of such a sight. Pendry, of Chicago, used to put black rings around his bow above the handle and would line the appropriate one with the gold. This was ruled out by the other men as not being pure archery and after that he got his elevation by extending his thumb up the belly of the bow and lining a wrinkle or something with the bull's-eye.

A few years after the war the sight on the bow for use at short ranges was brought into sudden prominence in the following way. Melrose, Mass., has produced three skillful makers of archery tackle, Whitman, Frentz and Shepherdson, and of the trio Shep was the most inventive. Along with his jointed bow and lathe-turned arrow came his delicately constructed bow sight. In design it was a slender rod about five inches long, attached to the bow above the arrow plate by a collar, the joint permitting the rod to be adjusted to a vertical position even if the bow were tilted to the right in shooting. Sliding on the rod was a little transverse bar, ending in a bead, which could be fixed at any height by a set screw.

It so happened that Shep initiated Paul Crouch into archery and taught him to shoot with the sight. Inasmuch as Paul almost immediately became the best archer in America we all thought, quite erroneously, that his phenomenal success was due in large measure to the aid of the new instrument. Therefore we felt that it gave the archer an unfair advantage by doing away with the difficulty of aiming the bow and arrow in the simple way of yore. Sides were taken and discussion waxed hot. But sights were evidently here to stay as they were at once adopted from ocean to ocean and any attempt to discourage their use was vigorously decried by the newer archers as repressive fogysm. Some became extremely elaborate, looking almost like surveyors' tools. Later there was a tendency toward simplification, many being merely a hooked rod attached to a collar in an adjustable manner and some be-

ing no more than steel pins thrust into bands of adhesive tape about the bow.

Undoubtedly the sight is a help to many people but it has won only one championship, that of 1925. In a splendid spirit of sportsmanship Crouch shot without one in his second victory of 1927 and neither he nor the succeeding champions have used them since. The great Californians began with them but soon gave them up. Mrs. Cummings, Miss Duggan and Russell Hoogerhyde have never used them. All of our American records, except General Thord-Gray's indoor eighty yard feat, have been made with the bare bow.

A still more sophisticated sight, which was first suggested by McMeen, has been elaborated by several archers but particularly by Dr. G. R. Hays of Richmond, Indiana, whose specialty as an oculist not only caused him to be interested in it but gave him the ability to perfect it. The idea is based on the faculty of a glass prism to displace the image of anything seen through it. A circular prism is set like the lens of a monocle in a strong brass frame that has a short projecting bar to be stuck in a socket attached to the bow. A set screw in the frame allows the prism to be turned so that the thick side or base is directly downward when the bow is tilted for shooting, as otherwise the target image will be thrown to one side. The optical measure of prisms is called a prism diopter, which means a visual displacement of the object equal to one percent of the distance. At one hundred yards a prism of one diopter would therefore displace a target three feet. With a set of several prisms, increasing by one diopter, the archer may raise the image of the target three, six, nine, twelve or more feet by using the different lenses. Thus with his fourth lens he may seem to be looking directly at the target while in reality he is aiming twelve feet above it. As great care must be taken to keep a lens vertical it is usually marked with a line of ink or a scratch parallel to the earth and a spot or two is put along one side to show the right place for the target

image. This kind of sight may become more widely used by men with weak bows who have difficulty in finding an aim at one hundred yards. I have tried a few shots with it, but not enough to pass judgment on its merits. So far, it has not been responsible for good scores because it has not been used by expert archers. It is primarily intended for the long ranges but if the prism be set upside down it can also be used where an ordinary point of aim would be on the ground, though I have never seen it done.

If there be no limit to the use of auxiliaries to shooting many other so-called improvements may be found. For example a twenty-seven inch string connecting the cord and handle will make it impossible to overdraw and also indicate the exact length of a correct draw for each shot. It is also very easy to draw and loose without bothering with one's own awkward fingers. I once made a short, wide hook, set in a cross handle, by which I could draw a bow with ease and could loose a shaft superbly by the slightest side twist.

In fact there are all sorts of things like that but where are they to end? For my part I think that there are distinct limitations which should not be crossed. It reminds me of the time Travis won the British golf championship with a "flat-iron" putter. No one had foreseen such a thing and no rule existed to forbid it but the powers that regulate golf saw that it was not in the spirit of the game and ruled it out for future contests. It is thus that I, in company with all English and most American archers, feel about the use of auxiliary appliances to the simple bow and arrow.

Some archers suffer from physical disabilities and, of course, must be granted such mechanical assistance as they require. Thus, several enthusiastic and excellent shots are obliged to sit down while shooting; in fact, archery is one of the best sports in the world for those who are deprived of the normal use of their legs. There are also a surprising number who have lost one or more fingers from the drawing hand.

Some have overcome this by learning to shoot left handed but such a sacrifice is not really necessary. It is always possible to shoot in the oriental way with a thumb ring or they may simulate the finger draw by using a hook, like mine, or by constructing a more elaborate mechanism of catch and trigger or, best of all, they may try a simple device that was conceived by Tracy Lay of Washington. This consists of a narrow strap of leather which is looped at one end around the hand, is led under the palm and around the bowstring beneath the arrow, and is pinched, with the loose end, between the thumb and first finger knuckle. It gives a strong hold and can be loosed by a slight relaxation of the squeeze. The arrow is held on the string by a close fit of the nock. If desired, a knot or other thickening may be made in the loose end of the strap to prevent slipping.

At the Chicago tournament of 1930, we of the east were surprised to see some of the Californians sweeping their arms slowly backward and downward in exaggerated arcs as their arrows were in flight toward the target. Those who shot in that manner made very good scores, notably Douglas and Styles with Yorks of 1007 and 1002 and Betty Gene Hunt, winner of the intermediates, with a Columbia of 932 and a perfect end at thirty yards. In 1931, at Canandaigua, the more pronounced operative gestures were for the most part discarded.

It is the so-called "relaxed method" of Chester Seay of Los Angeles and because of its wide adoption and good results it deserves analysis. Fundamentally it is based on nothing new as every principle within it, to my personal knowledge, has at some time formed part of some archer's creed. In purpose it is a revolt against stiffness and improper management of the upper extremities. When correctly done it gives a just balance between the two arms, a smooth loose and a feeling of coördinate ease. It directs the archer to grasp the bow loosely, to feel that he pushes as much as he

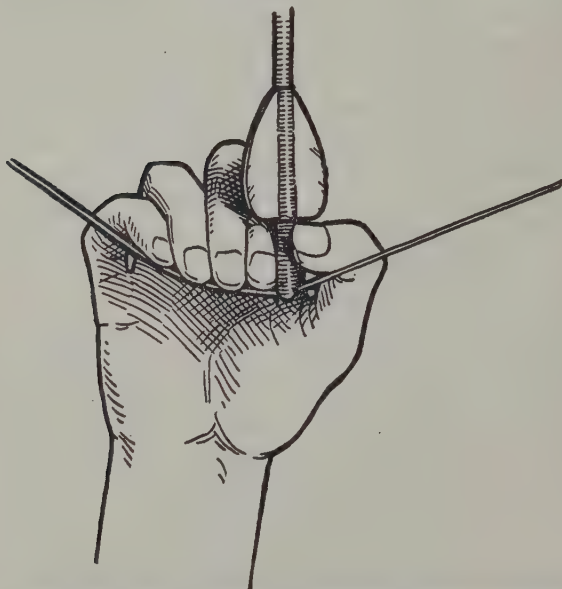


pulls, to release by a spreading of the shoulders due to contracting the muscles of the back and to hold himself steady for an instant after the shot. On this last point his words are: "Do not move after the shot, but hold yourself steady and analyze your position." Of course these principles have been brought out in the preceding pages of this chapter, yet there are distinct differences between his method and mine. Although I tell one to rock on his feet, wobble a little in his joints and perhaps give a tug or two on the bowstring to loosen his muscles in preparation for the final effort, exactly as an athlete limbers up in any other field sport, I also say that he should then stand set and stiff and bring the bow arm up with the elbow locked. Mr. Seay, on the other hand, teaches his pupil to stand with a feeling of relaxation, to bring the arm up with the elbow bent and to straighten it out at the moment of loose. In fact the loose is largely accomplished by the final push of the bow arm. I believe that he likens it to the sensation of breaking a string stretched between the hands.

Since an arrow takes about one one-hundredth of a second to leave the bow after the string is loosed, the act of shooting has really been finished during the instant of holding oneself steady, yet, to continue the feeling of ease in exertion, his pupils then allow their arms to float gently apart in graceful futility, much to the fascination of the unused observer.

As I said in the first line of this chapter, there may be as many ways of shooting as people who shoot, since all archers vary in details. This way of Seay's is a good one but it is no better than some others. In a pamphlet of instructions which he has published he does not seem to have understood the meaning which is properly inherent in some of the classic terms of archery, for example he is much distraught by the word *pull* and proposes to replace it with *stretch* as being more indicative of balanced stress. To quote: "Pulling is as real as though we were pulling on a rope fastened to a tree.

In pulling we lean backward and pull with both arms and we use exactly the same action in pulling a bow." How could the technical significance of a word be less apprehended? Was not the true meaning conveyed by Hugh Latimer, Bishop of Worcester, in a sermon to Edward VI in 1549 when he said: "My poore father taught me how to draw, how to lay my body in the bowe, and not to draw with strength of armes as other nations doe, but with strength of the body."



The Sioux Draw as taught by Compton to Pope and Young and used by the latter habitually and by the former in "Hiawatha" shooting.

## X

### TACKLE

THE tyro who is anxious to begin shooting wants, and should have, the simplest directions. He should be told in few words what to get and how to use it and should leave the study of the finer points of the art until his growing experience puts him in a position to remember and profit by it. With this in mind I will say to a man:

Buy a six-foot lemonwood bow weighing forty-two pounds and a dozen twenty-eight inch arrows. Either buy, or make from the directions in this book, a bracer and three finger-tips. He is then fully equipped to shoot and shoot well.

To a woman: buy a five foot six inch lemonwood bow weighing twenty-two pounds and a dozen twenty-six inch arrows, with the same directions about the bracer and tips.

Now, do not say that I have made him read through thousands of words with a hopeless confusion as the chief result, to find so simple a matter.

Yet there must be reasons for the choices I have made and doubtless many archers think there are still better reasons why I should have specified something else. I will therefore talk freely and fully for any who may care to hear.

The bow about six feet long is our standard weapon which has been tried out through so many centuries and found to be the best that there is no need here to try to defend it. If a person draw a twenty-seven inch arrow, or if he shoot a bow of forty-four pounds or under a bow may with advantage be shortened to five feet ten inches, or even to five feet eight inches, though in the last case there is much greater risk of breakage. In a general way the shorter a bow the better cast it has, up to the limit of safety. For most men six feet is satisfactory and safe.

A bow consists of an upper and a lower limb, with a grip, or handle, in the middle. On either end is a piece of grooved horn called a tip. One side, which is held away from the archer in shooting, is nearly flat and is called the back. The other side is round, is held toward the archer, and is called the belly, or face.

Unquestionably the best wood for a bow is yew. In Northern Europe it has been a favorite since neolithic times, as the only bow found in England that I know of, belonging to that period, was made of a branch of yew wood, a rather poor piece, full of imperfections, but made with skill, even to leaving more wood in the places which were naturally weak. I suppose that you will immediately wonder why I began this article by advising the purchase of a bow of lemonwood when I now say that yew is the best. The reason is twofold, first that lemonwood is very much cheaper and second, that it is not so apt to break.

Bows are divided into two great classes: composite bows and longbows. Composite bows are treated of in another chapter and I will say nothing about them here. Longbows are further subdivided by most writers into self-bows and backed-bows. In a self-bow the back and belly are of one piece and in a backed-bow they are made of two pieces, glued together. I prefer to make the classification a little more definite and carry it to six heads, namely: self-bows, spliced self-bows, backed-bows and spliced backed-bows, jointed self-bows and jointed backed-bows. A spliced bow is one in which the two limbs are different pieces of wood joined in the handle. The splice may be either a single-fish, when the ends are like the letter V, or a double-fish when they are like W. It is then obvious that in my classification a self-bow is a bow made of one piece of wood, a spliced self-bow is made of two pieces of wood fished together, a backed-bow is a self-bow with an artificial back glued to it and a spliced backed-bow is made by fishing together two limbs and gluing thereon an

artificial back. Jointed bows have a metal joint that will come apart like a fishing rod, or sometimes like a hinge.

The differences between the six kinds of bows are probably less than you may imagine. All of them are perfectly good weapons. I have shot with all kinds and have made as good or as bad scores with one as with the other.

Nevertheless I should say that my first choice is the self-yew. Some archers say that yew wood varies a little in character in different parts of the trunk and, therefore, if a billet be split into two staves and these be so joined that the ends which lay together in the original wood occupy the same relative position in either limb, that is, spliced together or at the ends, the elastic properties of each limb will then be exactly the same and the bow will be better than a self one. It is a pretty theory and sometimes is true. As you will find in the chapter on making yew bows, it is necessary to follow the curves of the grain in forward and backward directions, though of course a bow must never bend at all toward the side or it will turn and twist when it is strung. Often these curves are very marked and would make a most misshapen bow if they were not matched by splitting and splicing. But when this is done and each limb has exactly the same abnormal curvature in the same place the effect to the eye is even pleasing and ornamental and the shooting qualities are not impaired.

Perfectly straight grain, running for full six feet, is a very hard thing to find in yew and yet it does exist. I have two bows from Styles in which the lamellæ of the grain are as even as a pile of fresh sheets of paper. I think that this is the ideal and in wood of that perfection I do not believe that there is any real difference in the resiliency of the wood at the two ends. Certainly I cannot see it if there be.

The only complaint that I have ever heard against a self-bow is that it always follows the string, or gets a permanent curve toward the belly. This is undoubtedly true but what

difference does it make? Ford said that such a bow was sweeter in the hand than one that was perfectly straight and I see no reason to differ from him. Besides, the curve is never very great and its maximum is reached in a few days' use. One of the best archers this country ever produced used to let a new bow stay strung for the first two or three days to get its set and be done with it.

In a perfect self-bow I would have no handle at all, except an enlargement in the wood itself to make the centre rigid and to fit the hand. On account of the archers' paradox, which I discuss elsewhere, I believe that the narrower a handle the straighter the bow will shoot and I therefore see no reason for enlarging the lateral diameter of the grip with an external layer of any material.

Spliced bows must have a handle, or grip. The joint is not only unsightly in itself but it is always strengthened and protected from dampness by a tight wrapping of either linen thread or raw flax laid in a matrix of glue. This must be covered, to make it beautiful to the eye and pleasant to the hand. Most archers like something rather soft. Ford said that nothing was better than plush. I formerly supposed that such an elegant material was introduced in modern days of luxury but recently I noticed that an old expense account of the time of the Tudors contained an item of plush for bow-handles.

The bows that have come from Aldred, who is dead, and his son-in-law James Izzard, who is at present heading the archery workshop of Ayres, in London, have often had handles made by winding them about with rough gimp tape, with a selvage on one side only which is overlapped by the next turn. This kind of tape can be bought of dealers in upholsterers' supplies and if laid on a coating of glue, as all similar handles should be, is well-nigh perfect of its kind. I should say, in passing, that a waterproof glue, or cement, such as shellac, or dissolved celluloid, which is sold under the



name of DuPonts' Household Cement, or casein glue is the best to use as it does not become sticky in the warm summer days.

The handles of golf clubs are made of split leather, with an unfinished side out. This does just as well for bows and I have often used it. The same spiral wrapping may be used if desired but I think it is just as good and perhaps better to cut the leather to the proper rectangular shape, skive the edges to give a smooth, overlapping fit, lay it on in glue and wrap a bandage around it to hold it tight till it sets.

Or another way of fitting the leather handle, which is quite as good, and possibly even more easily done, is to skive only the upper and lower edges, wrap the leather around the bow so that it overlaps, and then run a very sharp knife down the back, cutting both thicknesses at once.

Fishing rods are gripped with cork or cane and these also are excellent for bows. So far as I know the first person to advocate the use of cork and to back up his theories by making perfect and beautiful handles of it was Dr. Goldberg, of the Wayne Archers. He used narrow strips of very thin sheet cork, which can be bought at the little cork stores which seem to exist especially at seaports, cut them to special shape as his eye directed and laid them on spirally. Being an oculist and accustomed to the finest possible mechanical work his handicraft was exquisite. A final rubbing with fine sandpaper gave a perfect finish. There is no better grip than this.

I have myself put on cane handles when the original wrappings were worn off, for the simple reason that I always have some cane about the house for mending chairs and it is so easy to do. There is not much to be said about cane that you cannot as well imagine for yourself. It makes a hard, serviceable and good-looking handle. The Japanese wrap their bows with cane but make the grip of unfinished leather. I might have said that just as so many of our discoveries were found to have been already in use in China for Heaven knows how

long, so the old Chinese war bows have cork grips, though they are very crude and rough in comparison with ours.

Dr. Pope and his followers have introduced linen cord as a handle, usually finished for beauty's sake with a small band of split leather at each end. It may be wrapped in any color and has the added advantage of giving great support to a splice, or fish-joint. A coat of waterproof varnish finishes it.

When G. P. Bryant was at his best, in 1912, he slipped a piece of soft elastic rubber tubing over the handle of any bow he used. It gave him just the sort of grasp and feeling that his long experience and masterly skill had taught him to prefer. So most of our master-bowmen have preference for some particular handle which suits both the physical structure of their hands and their particular technique in shooting.

If the hand in which you hold the bow be held out before you, in a natural position with the palm up, you will notice that the two places on which the handle of the bow rests are not in a line. Obviously the handle must lie in the little hammock of skin between the thumb and forefinger. If the hand, in shooting, were kept perfectly straight with the wrist this would be the only place it would touch, and indeed, some experts do hold the bow with just such a loose manner, pivoted on a cord of skin and muscle, as it were. As a rule, though, nearly everyone turns the wrist slightly upward, when the hand is ready for shooting, so as to bring the thenar and hypothenar eminences into line and thus give a support which, in my own case, measures about four inches, to bear on the bow handle. In popular language these two eminences are the ball and heel of the hand. This is a good strong way to shoot but, in bending the wrist, about half an inch of length of draw is sacrificed.

It was S. G. McMeen whose fertile mind first led him to fit a handle to the shape of his palm. At his first tournament, in 1916, at Jersey City, he wrapped something that looked to the rest of us like a black stocking around the lower part of

his handle, although he disclaimed originality and said that he had read of the idea. It is at once obvious that by increasing the thickness of the lower end of the handle it can be made to rest on the heel of the hand while the wrist is still straight. In other words it brings the two eminences to the same distance from the elbow.

The idea seemed to me to be a very good one and when I came home I worked on it a good deal. The first thing I made was a piece of black walnut about two inches long and five-eighths of an inch thick at the lower end. I grooved it to fit the curve of a bow-handle and fastened it on with adhesive tape. It worked perfectly and none that I made subsequently was as good. With it a 28-inch draw seemed almost as easy as a 27-inch without it and my accuracy seemed to be increased. Led on by this I glued large blocks of cork to both the front and back of another bow and carefully sculptured them out till they fit my hand exactly. Somehow I could not do so well with that one. I never used either of them in a tournament, though I could hardly say why. In fact I have shot with a regular handle for years past. Nevertheless the idea of a fitted handle is all right and may be used with assurance by anyone who needs to lengthen his draw or who can shoot better that way.

The jointed handle, making what Ford called a carriage-bow, but which we call a jointed bow, has been used for a long time in Belgium and France. In America jointed handles of two kinds are common, both made of thin steel tubing. In one each limb has a ferrule and both are shoved into a tubular handle; the other is like a joint of a fishing rod. Sometimes the tubing is flattened on the back to assure correct adjustment of the limbs but more often the same result is secured by shaping the ends to interlock.

Does it not seem odd that after having used all sorts of handles I should prefer to have none at all, but such is the case.

Now, after having said so much about handles in the middle of the bow, let us focus our attention on the ends and consider the subject of tips.

To my mind the only advantage of a tip lies in its æsthetic value. The bows of all savages and barbarians and even such highly finished weapons as the wonderful composite bows of the Orient have only nocks cut in the end of the bow itself, made for holding the string. They are exactly the same as any boy who whittles a rude bow out of a stick may make. There is nothing better except for looks.

In Northern Europe horn tips have been used on bows from very early times, I suspect almost, if not quite, from the time of the Conquest. Many bows were made with simple notches or with merely a metal peg in one side but, while I cannot quote positive authority, I am inclined to believe that horn tips were used too.

The horn tip permits of curving lines of graceful beauty, like a violin. It is cut in a pretty little twirl that fittingly ends the longer bend of the body of the bow. In Flanders it is often carved into the head of a cock or griffin with artistic effect.

Probably bulls' horn is the best thing of which to make a tip. Next to that comes the weaker horn of the steer or cow. Frenzt stresses the essential, æsthetic fitness of things in advocating the use of horn on wood, both products of nature's growth, but I cannot deny that excellent tips may be made of compressed wood fibre and metal. Bakelite has also been tried out fully but it is too liable to fracture if the bow be set down suddenly on a stone.

I have seen four kinds of metal used for tips. A bow of split bamboo, made in Brooklyn about 1880, which was once in my hands, had beautiful little tips of brass, plated with nickel. They were light, strong and pleasing to the eye and made me wonder why such tips were not in more common use.

A few years ago Palmer had a lot of tips cast in aluminum, at his place of business, from a model which I furnished. These also were excellent and many of them are in use on bows to-day. More recently some commercial houses have tipped their bows with metalloid. Duralumin is best of all the metals.

In all metal tips it is possible to bore the hole with parallel sides, on account of the strength of the material and, for the same reason, they may be made very small and therefore light. Horn tips are drilled with a conical hole. As the specific gravity of horn is not very different from that of most bow woods, a tip made of it does not weigh much more than an enlargement of the wood for a nock and does not materially affect the cast. Experiments on this subject are cited on page 467.

Regarding the length and shape of the two limbs I will not speak here because those subjects are fully covered in the directions for bow-making.

As is mentioned in several other places in this book, and as is obvious to anyone by taking a little thought, the back of a bow is stretched and the belly compressed when a bow is bent. Anyone who has made himself a bow of almost any of the woods which have a distinct line of demarkation between the sap wood and the heart wood knows that the sap wood comes off under the spoke-shave in long flexible shavings which will stand considerable stretching. In some woods the heart will do the same but in others it will be short and friable, but hard enough to stand compression well.

For these reasons a yew bow is made with a thin back of sap wood and a thick belly of heart wood and this plan is followed with many other kinds of timber.

It is not always necessary to do so, however, and especially I think that proportion may be disregarded in making bows of the wood which I set next in merit to yew, namely, *Toxylon pomifera*, or osage orange. Frequently this tree is called by



other botanical names, such as *Maclura aurantiaca* or *Maclura pomifera*, but I have the authority of William O. Robinson, of the U. S. Department of Agriculture, W. N. Watkins, Wood Technologist of the National Museum and Dr. F. V. Coville, Chief Botanist of the United States, that the name given above is the right one. Now, who dare deny it? Toxylon was not only given a year earlier than *Maclura*, but McClure was a geologist who had nothing whatever to do with the tree. It was merely named after him (Thank Heaven, too late!) by a friend. Toxylon means bow-wood in Greek, as Bois d'arc does in French or Bowdark in frontier American. Let all loyal archers use it!

This is a wonderful wood, almost, but not quite, equal to yew itself. It grows over a wide area in the United States, partly because in some regions it is indigenous and partly because of its extensive use years ago for making hedges. In many places these old hedges have been neglected almost ever since they were planted and the trees are six or more inches in diameter. Everybody knows the tree, with its great, round, sweet-smelling but utterly useless fruit.

The sap and heart are very distinctly separated both in color and texture, the former being almost white and the latter a rich, tawny yellow. In fact during the war, when we heard so much about dye stuffs that our minds ran along those lines, I made a good mustard colored dye out of an infusion of chips and dyed a piece of wool with it. One of the best bows I own is of osage orange. My friend, the late Mark Mauser, made it out of an old log which had lain on the ground behind his place for at least eighteen years and was even partially decayed on the bottom, though the top was as hard as iron. It was his first and only attempt at the bowyer's art and a rough looking weapon it is. I think I counted sixty-four checks in its back, it is crooked in all directions and when drawn bends almost as much sideways as in the true plane, and yet such is the spring of the wood that I have twice won the



flight shoot with it and have made a winning score of over 1,000 in the double York round. This bow has no sap wood at all and neither has another, but weaker, one made from the same log and yet the cast is all one could wish to see.

Pope's experiments with yew seemed to prove that the cast is all in the heart and the function of the sap is to prevent breaking. The toxylon is so tough that it will not break anyhow, so there is no need of the sap. In fact, Robinson says that not only is the sap worthless, but that the nearer the heart wood comes from the centre of the tree, the better it is. In southern Missouri and that general part of the United States it is common enough to be used for fence posts. It is readily obtained from dealers in archery supplies, most of them offering both full length staves and half length billets at moderate cost.

This disregard of the sap wood also applies to the wood which I name as third choice and of which the vast majority of commercial bows are made. In fact I do not believe it has enough sap wood to take into consideration.

I refer to what is called lemonwood by the trade but which in reality is *Degame* or *Calycophyllum candidissimum* D. C., as I have been informed by the Smithsonian Institution. It has nothing to do with lemons and in the log with the bark on, suggests cedar in its external appearance. Inside, it has no resemblance at all to cedar but is of a light yellow color, has a very fine close grain that you can hardly see and is moderately heavy, weighing about forty-nine pounds per cubic foot when dry. It is almost always confused with lancewood. Bows are very easily made of it because the grain is so close that even if it be disregarded to some extent they will still give good service.

Because I put two other kinds of wood ahead of lemonwood does not imply that it should be awarded scant merit in your estimation. Bryant used a lemonwood bow when he established the record for the American round in 1912, although

he had plenty of yew bows to use if he had chosen to do so. Jiles, to my personal knowledge, owned lots of yew bows and even made a good many himself, yet he gave them up in later years and turned to lemonwood.

When he won the championship in 1924 he did it with a lemonwood bow, his reason being that he thought it steadier than yew in changes of temperature.

Lemonwood is much the best wood to furnish to boy scouts or to manual training classes. It can be bought very readily, cut into staves which do not need too much finishing, and is easy to work.

Lancewood, or *Oxandra lanceolata*, seems to me to be much like lemonwood, but here is what Robinson says: "From the bowyer's standpoint, it is considerably heavier, stiffer, casts better, jars terribly, is comparatively brittle and chrysals easily. Herbert Stone, the British wood authority, names it as the most perfectly elastic wood."

When a bystander who knows nothing of the art of shooting approaches an archer, with his cheeks fairly bulging with questions, the first is whether the string be made of catgut and the second if the bow be made of hickory. The Indians used hickory perhaps more than any other one wood for their bows and for what is probably the same reason it is the wood of choice for the toy bows of boys. The first bow I ever drew was made of hickory for me by an old negro servant and for its kind it was a good little specimen.

Undoubtedly its popularity is due to its toughness, which excels any other wood with which I am familiar. If you pare off a sliver of hickory from a stave that has been properly seasoned you can pull on it with incredible force before it breaks.

Hickory wood can be seen with the naked eye to consist of alternate layers of dense and porous ligneous tissue. Some think that the spongy layers are crushed by continuous shooting but it seems to me that if this were so it would chrysal, which, in fact, it is not particularly liable to do. Rather do I

think that there is a naturally slower spring inherent in it, a more sluggish resiliency than in lemonwood or yew, for though a very fair bow can be made of hickory it will never be quite equal in cast to a similar one made of the other three woods.

Palma Brava, or *Livinstonia rotundifolia*, deserves comment.

I have never made a bow of it myself so I can judge of its merits only by report and inference. It is quite true that savage tribes use thousands of bows made of palm wood and it is also true that none of them shoot as well as our bows do. Yet here the design of manufacture enters into the question even more than the nature of the wood. Dr. Pope told me that he thought it was a good sturdy wood of very much the same qualities as hickory when used in self bows, that it was sluggish in cast and heavy in hand and yet, withal, was a good wood, by no means to be despised.

When it was known that bows of extraordinary strength, to be pulled against the feet, were to be used in the flight shooting contest of the national tournament of 1925, Mr. Knight, who is a bowyer of great experience and skill, purchased a stave of Palma Brava and fashioned it into a perfect weapon of Hercules. To his great disappointment it did not cast so far as a good yew bow of fifty pounds and he did not bring it into actual competition. It is safe therefore to assume that while Palma Brava, on account of its reasonably good springiness, straight grain and durability may be a useful wood for bows intended for summer camps, boy scouts and the like, it will never prove a serious rival of yew, osage orange and lemonwood in the hands of experts.

Leaving self bows and taking up spliced self bows we come to a more restricted field. Of course any kind of wood can be spliced with another piece of its own kind or with another sort of wood, though I have never known the latter to be done, but there is no need for doing so in wood which can easily be

obtained in full length staves. Why should one splice Palma Brava when the tree grows as high as a house and as straight as a flagpole?

Splicing is almost entirely limited to yew, partly to match the wood but usually because it can be found only in short lengths. However, splicing does permit the setting back of the two limbs so that their backs make an obtuse angle with each other, or, in other words, form a reflexed bow. Whether reflexing a wooden bow is advantageous or not is a question which gives rise to such differences of opinion that it may never be unanimously settled. Perhaps it depends on how the bow is to be used. For target shooting I personally like to have my bow strung considerably higher than the classical fistmele, usually seven or seven and one-half inches, and this is more safely done if the bow have already followed the string so that there is a space of a couple of inches or so between the handle and the cord. A reflexed bow has the tips so far behind the line of the handle when it is new that even if it be bent a little from use the line between the tips will not come much, if any, beyond the grip and high stringing will therefore put it in greater jeopardy. Thomas Waring's book which was published in 1822 contains the excellent aphorism that a bow fully drawn is seven-eighths broken, for it is true that if a bow of yew which is made for a twenty-eight inch arrow be extended to thirty-two inches it will often break. Of course high stringing has much the same effect as over-drawing and is more likely to be a cause of breakage during the draw in a reflexed bow than in a straight one. Ford says that all reflexed bows kick in the hand. He knew much more about it than I ever shall but nevertheless I am sure that I have shot some reflexed yews which were very sweet.

I do not think that enough attention has been paid to the danger of a spliced bow's coming apart in the handle. In my own experience I have had four spliced yews and one spliced lemonwood, two of which were made by professional bowyers

and the other three by well-known amateurs whose names are frequently mentioned elsewhere in this book, come wholly or partially unglued in the fish and break there. In this list I do not include many other bows made by inferior workmen, including myself, which have suffered a like fate. In justice I must say that I have never seen this accident happen to a bow made by Styles, nor to the best English bows. English books are always speaking of ways to keep the dampness from a bow. In this country we not only have to guard against dampness but also against dryness. If a bow be kept in one of our hot, steam-heated houses all winter, it will dry out so that the tips will often be loosened and drop off. Such shrinking must put an undue strain on the surfaces of the joint too, I should think. On the other hand a week such as we passed through here a fortnight ago from the time I am writing, when the thermometer averaged ninety-eight in the shade and 120 or so in the sun, and when the humid air felt like a steam bath, is enough to soften almost any glue sufficiently to cause it to slip under the strain of shooting. I remember that we had a hot, humid spell before the tournament of 1920, in Wayne, which proved too much for several spliced bows belonging to our local archers. This danger is sufficiently real to act as a considerable factor in influencing my choice for a self-yew.

When archery was at its height in the '80's, it must have been the fashion to use backed bows. I have seen any number of them and have owned several myself. The backs were usually of hickory, though sometimes of lancewood or lemonwood, and the bellies were as often made of one of the tropical hardwoods. Many of these woods are familiar to us from their use in the manufacture of billiard tables and cues. I believe that a great many of them would be very good as the bellywood of backed bows but I am familiar with only a few of the commoner ones, which are also much used for fishing rods.

Beefwood is the name given to a dark brown wood which

has the color of dried beef. It is used more than any other for footing arrows and is also made up into bows. When I asked the Smithsonian for a scientific description of it I received the following:

"Beefwood in Trinidad is *Rhopala montana*, a valuable timber; but in Australia the name is hopelessly vague, being applied to members of four genera, *Banksia*, *Grevillea*, *Hakea*, and *Stenocarpus*, and to several species of the widely differing genus *Casuarina*.

"Bullet-wood, *Minusops globosa* Gærtner, of Surinam (Dutch Guiana) is also called Beefwood, and since its uses are similar to several of the woods for which information is sought, may be the one desired. Wood very heavy (63-80 lbs. per cu. ft. dry), straight and close grained, strong, easily worked." Robinson says that this is the kind we know of and that another variety, *Minusops balata*, is indistinguishable from it by the wood alone.

Greenheart is another wood which I have quite often seen in bows. I once owned a flight bow made of it by Duff. As an example of its durability I have been told that the docks at Liverpool were made of it in the eighteenth century and are in good condition yet. It is very elastic and makes fine fishing rods. Smithsonian reports:

"Greenheart, *Nectandra rodii* Schomb. Range—North-eastern South America and the West Indies. Wood very heavy (58-76 lbs. per cu. ft.), hard, tough, strong and elastic. Used for piles, bridge and ship timbers, carriage shafts, fishing rods, etc."

Bethabara or *Tecoma araliacea*, bethaberra, washaba, noib-wood and Surinam greenheart are all the same thing. Most of our supply comes from Dutch Guiana. Robinson makes the following interesting remarks about it: "The wood is a great favorite for fishing rods and Malcolm A. Shipley, a Philadelphia fishing rod manufacturer, coined the name from the names of his two daughters, Elizabeth and Barbara. The



name noibwood was adapted from the initials of a reply to a query, 'What kind of wood is this?' The reply was, 'None of your business,' it being a fishing rod manufacturer's trade secret. It is close grained, is the stiffest and toughest of the tropical woods I know of and seems to me to be the best arrow footing wood. Like many other very hard woods it must be treated with ten percent sodium hydroxide before gluing with casein glue. It is easily identified by its yellow resin, lepachol, which turns wine red with alkalies in water and will turn the hands of the worker salmon pink with soap. It does not warp in footings, if properly made."

This by no means exhausts the list of woods available for bow making. Black walnut backed with hickory makes a good bow and a very pretty one.

Mulberry, or *Morus rubra*, is botanically affiliated with osage orange and may be worked in much the same way, omitting the sap wood.

Red cedar is a very satisfactory wood, which at present is enjoying some popularity and can be obtained from various archery dealers. Staves should be chosen carefully, as they vary greatly in quality. It is a softer wood than yew and therefore more bulky and because of a greater liability to chrysal should be made wide and rather flat bellied. Either a fair amount of sap wood should be left or else it must be backed. I have a fifty-pound hunting bow with rawhide backing made by Dr. Pope that has as good a cast as one of his yew bows of similar shape. Captain Arthur Blackburn, of Baltimore, uses a hickory backed red cedar which he has shot more than sixteen thousand times.

One of the best of bow woods is bamboo, but only if it be in the artificial form known as split bamboo, where the stave is made of many solid strips of the hard outermost portion glued together. The idea is an old one for fishing rods and so it was naturally carried over to bows, with their similar bending. Even in the second year of modern archery in

America, on March 18th, 1879, a patent for them was granted to Mr. Malleson, of Conroy, Bissett and Malleson, manufacturers of archery and fishing tackle in New York. I had one of their bows in my keeping for a long time, as a loan, and shot in it repeatedly. It was pentagonal, like a fishing rod, without a flat back and was tipped with nickeled brass. Even at the age of fifty years it had a wonderful cast, though perhaps so long a seasoning would increase that function rather than lessen it, but in the end the pieces began to separate because of the excessive dryness of the glue. In the catalogue of that old firm, which lies before me, I see that they also made bows of split bamboo backed with snakewood or hickory that sold for twenty dollars. Self lancewood bows were priced at \$1.50 to \$7 and the highest priced fancy wood with hickory backing was \$12.50.

A testimonial from Will Thompson said that his split bamboo bow was absolutely unbreakable and that it was a better bow than could be gotten from England. Another archer named W. C. Beecher asserted that his specimen, of forty-five pound weight, would easily outshoot his sixty pound English bow, and added that "in the hardihood of experiment I put my foot on the grip piece and drew the cord nearly five feet without damage to the bow."

In spite of the undoubted merit of such bows they disappeared from the market for half a century, probably because the limited demand of that period of toxophilotic depression did not tempt their production by makers of fishing tackle.

In 1928 the South Bend Bait Company hit on the idea again, quite independently, and ever since have been making bows and bow staves of which they have every reason to be proud. I have shot at least half a dozen of the bows, of all weights, and like them very much. They have splendid cast and if they be properly made their shooting is as smooth as silk. Russ Hoogerhyde used three of them at the national tournament of 1930, when he set a new record for the Amer-

ican. All three looked and shot exactly alike except that they were of different weights for the three ranges of the York. The stave for this kind of bow is not made of wedge-shaped pieces, like those in the old Malleeson bows or in fly rods and bamboo arrows, but the component strips are rectangular in cross section and are glued in layers with the long dimensions running from belly to back. This seems to give better elasticity than if they run sidewise.

Without going into details, some of which would be more or less conjectural, it is enough to say that one may use sassafras, black locust, gumberry, hornbeam, several of the so-called ironwoods, elm and many other trees. For one who loves tools and likes to experiment there is much fun to be had in making bows of different materials. The great requisite is proper seasoning and the most annoying fault of our native woods is their frequent liability to chrysal.

Seasoning is a very important and interesting subject. Probably from the earliest prehistoric times wood has been preserved or improved in strength, resiliency and integrity by leaving it free to the air but protected from rain and rot for long periods of time. Even now, conservative British bowyers prefer not to use a stave that is less than five years old, having trimmed it a little each year. In the drier climate of America we believe that two years are sufficient, though three will be better if they may be had. Without question, air drying is a good way, tried and true, and millions of excellent bows have been produced by it.

It is not enough to merely dry the wood. Regard must be had to the preservation of its chemical and microscopical structure, both by allowing the natural cell contents to insipisate without being replaced with more volatile fluids and by taking care lest internal steam should rupture the cell walls. If the wood be laid in running water to wash out the sap or be baked in a hot oven it will turn out to be weak, sluggish and brash. The Indians bent all sorts of curves into their

bows without impairing the cast and, like many other savages, they hardened the wooden tips of arrows by fire. Professor Curtis thinks that the Sac and Fox Indians whom he knew in his boyhood tempered their hickory bows by some kind of seasoning process. I have been told that an old Smithsonian report mentions as a fact that Indians would rub bears' grease on their bows and hold them for a long time over a fire. N. P. Whaley, editor of *The Archery Review*, of Tulsa, Oklahoma, who was born and brought up among Indians, told me that in six weeks the Cherokee would fully cure osage orange by smoking it like a ham. He has seen a bow made that way shoot well over two hundred yards.

During the war it became necessary to season vast quantities of spruce for airplanes in a short time while preserving its full strength and elasticity, a problem closely allied to our own. The kilns which were devised to accomplish that result are described in government bulletins, but the only person who, as yet, has designed, constructed and operated one for the special requirements of bow wood is Wallace H. Burr of Seattle, a teacher of manual crafts. The process has been so successful as to seriously rival air curing. It depends on an exact regulation of heat and humidity according to well established formulæ. Electric heaters, controlled by a bimetallic thermostat, furnish an even temperature which is usually kept at 110 degrees Fahrenheit. The humidity is governed by a humidostat which is much like a thermostat in principle except that it is made to move by moisture instead of by heat. It consists of two very thin slats of wood glued flat together, one cut with the grain and the other across. The much greater absorptive power of the latter slat makes it expand and curve the whole arm enough to close an electric circuit and thus turn on electric heaters under a water pan. Rather curiously, yew wood is the best for making the instrument. Mr. Burr puts two hundred or more green billets in the kiln at a time and takes them out in seven weeks with the moisture content

reduced to seven percent and the wood fit for immediate use.

While many good archers approve of kiln dried wood there are at least as many of equal authority who prefer the air dried. They point to the fact that the kiln dried wood used for airplanes in war time became brittle and unsafe after three or four years and assert that yew bows will do the same. They also claim that enough time has already elapsed to show that kiln dried yew will not increase in strength as air dried yew will undoubtedly do. These allegations are vigorously denied by Mr. Burr. It seems that the final decision will have to come from more extended experience.

A logical extension of the idea of increasing the strength or durability of a bow by backing it might naturally lead to experimentation in lamination or making a bow of many thin layers of wood. For example Will Thompson wished to find out just how much cast lay in the sap wood of yew and so, to settle that much-mooted problem beyond further dispute, he ordered Mr. Barnes to make him a bow by laminating strips of yew sap wood together. It was a complete failure, according to Dr. Pope.

In my possession are a dozen or more bows which were made by Mathias W. Baldwin, the founder of the great Baldwin Locomotive Works in Philadelphia. I bought them at a public sale a few years ago, together with many arrows, a belt and quiver, of the short style which was called a "well," and some other things which he used as a member of the United Bowmen of Philadelphia. Evidently the mechanical genius which bore such rich fruit in his profession found relaxation in experimental bowery for such a variety of laminations I have never seen elsewhere. For example four bows taken at random were built like this:

Bow A.

1. Rawhide back.
2. Black Palm belly.

## Bow B.

1. Rawhide back.
2. Strip of Black Palm no thicker than blotting paper.
3. Lemonwood, about one-fourth inch thick.
4. Black Palm.

## Bow C.

1. Hickory back about one-sixteenth inch thick.
2. Yellow Pine.
3. Snakewood.
4. Lemonwood. The last three of nearly the same thickness.

## Bow D.

1. Hickory.
2. Spruce.
3. Black Palm.
4. Lemonwood.

So I might go on through various permutations and combinations, some tipped with horn and some with bone.

I cannot see that one bow shoots much better or worse than another, among these of Baldwin. They are all thin, weak weapons, pulling about thirty pounds or so. The fundamental fault is that while they are made with a mechanical skill that few bowyers could equal, so far as smooth fitting is concerned, they are not thickened in the centre and consequently lose all their cast because they bend in the hand. However, I think that their sameness of cast does teach us that little or nothing is to be gained from mixing a number of woods together.

Perhaps there is no better place than this in which to speak of the prime necessity of having absolute rigidity in the centre of a bow. If there be any one predominant fault in the general run of cheap bows it is this central weakness which permits bending in the hand. The reason is an economical one; the need for much thicker bowstaves. Wood is the chief item of a bowyer's expenses, not counting labor and overhead, and it is a natural wish to make the supply go as far as possible.



By cutting the staves so thin that they will suffice for the limbs but will not give quite enough swell for the grip he can skimp a few pennies but the quality of his output will suffer greatly.

“He teacheth my hands to war; so that a bow of steel is broken by mine arms.” *II Samuel 22:35*.

Perhaps the idea of making bows of steel has arisen from time to time in the minds of men ever since they began to make other weapons of it. In crossbows it has been used almost from their first invention but for longbows I do not think it could have been successfully employed in ancient times or we surely would have some specimens of such handiwork in the museums. For bows designed or shaped like the Oriental reflexes it might easily have been practical and, if the following quotation from *Toxophilus* be correct, was probably so used. While giving the passage in full, it is well to suggest that the brazen and steel bows of Biblical citation can very well be put in the same category as the leaden feet of the sluggard.

“Scripture maketh mention of brasse bowes. Iron bowes, and style bowes, have been of longe tyme, and also nowe are used among the Turkes, but yet they must nedes be unprofitable. For yf brasse, iron or style, have theyr owne strength and pith in them, they be farre above mannes strength: yf they be made meete for mannes strengthe, theyr pithe is nothyng worth to shoote any shoote wyth all.”

Ascham's inferences were evidently based on his familiarity with the nature of longbows.

In the last century an Englishman whose name I cannot recall, spent a good deal of time and money in having bows made of the finest steel, both in England and Belgium. As his results were always disappointing, he doubtless used solid metal and stuck to the general form of the longbow. The best of his specimens did not shoot as well as a wooden bow

of many pounds less weight. Writing later, C. J. Longman said in *Badminton*:

“Bows have also from time to time been made of steel; but the recoil of this, or, indeed, of any metal, is so slow in comparison with that obtained from other materials, that a bow which would give the requisite swiftness of flight to an arrow would be beyond the power of the strongest man to draw. Steel bows have, therefore, never come into use, except in the case of the crossbow.”

The first steel handbow that I ever saw was in a collection of relics of the plains Indians. I was a boy at the time but I remember it very well and held it in my hand, though I did not shoot it. Of course it had been made by white men for an article of barter and it was very ingenious in design. One feature that it embodied I have often thought about since as a possibility in bows of metal; the turning of a complete circle, or close spiral, in the limb to give length of steel without length of string. The whole thing was made of one round bar of steel, maybe a quarter of an inch in thickness, turned on itself at each end like a hairpin and welded in the middle. It was a double barred bow, bent in a loop in the centre of each limb, not much more than two feet long over all.

During the war I wrote to Dr. Pope to ask what he thought of a bow made of two coiled springs that would unwind to form a bow shaped like an Oriental reflex, with the limbs at high tension before being drawn.

In 1923 the steel golf club handles that were beginning to appear suggested the possibility of joining two of them on a grip to form a bow. I took the matter up with a firm in Bristol, Ct., but nothing more came of it than considerable interesting correspondence.

Nowadays, when steel bows are so widely used in America, the story of final success in their manufacture is quite fascinating. In the fall of 1926, Dr. George Hays, of Richmond, Indiana, obtained from the American Fork and Hoe Com-

pany, some of the square, solid steel bar used in their heavy fishing rods. Starting with a six foot bow he fulfilled Ascham's prophecy by finding that its pithe was nothyng worth to shoote any shoote wyth and that it weighed only fifteen pounds. Cutting it down little by little to four and a half feet he finally got it to forty-five pounds but with an unsatisfactory cast. At the same time his friend Robert H. Cowdery, manager of the F. & H. plant at Geneva, Ohio, had become interested and, through his mechanics, had made bows of T-bar steel which as yet, however, were no good because of being too long. Hays then thought, quite independently, of using the tubular handles of golf clubs.

By the spring of 1927, Cowdery, having finished experimenting on bows of T and I beam sections, had adopted Hays' suggestion, and, on April 23rd, came to visit me at my home bringing with him a couple of tubular bows of beautiful appearance and graceful curvature. They were jointed at the handle, six feet long and tapering from five-eighths inch at the centre to half that diameter near the aluminum tips. The weight of draw was about forty-five pounds and the weight in hand one pound.

The next day I used one with success in the first tournament of the Philadelphia Archery Association and was at once convinced that it was a valuable addition to bowyery. A number of them were sold, but, though the cast was excellent, the incidence of fracture was too high. The manufacturers then returned to the T section but, profiting by experience, made it only five feet long. This was a very good bow and I used one a great deal. Shooting with it at Scarsdale, Thaddeus Merriman suggested that the cast would be as good or better and the cost of production reduced if the bow were made flat and then turned up at the sides, forming a U section. When that idea was passed on to Cowdery, he tried it out and found it to be sound. Ever since then a rounded U section has been the standard form, the final bow being about five feet two

inches long and jointed in the handle, which is armed with cork. It is a pretty little weapon, with its slightly reflexed ends, whether enamelled in color or shining in chromium plate.

There is no question about the merit of the steel bow. The best kind of scores are continually being made with it. In durability it is fool proof; it practically never breaks, at least as compared with wood, and it neither has to be unstrung to retain its cast nor does it lose power in the heat of the sun. The only trouble is that it has to be very carefully balanced in the making or it will kick.

The proper weight of bows for different people and different uses is an interesting question and one which is instructive to discuss.

I began this chapter by advising the beginner, if he be of the stern sex, to buy a forty-two pound bow and I think that figure is about right. If any change were to be made I would put it on the conservative side and make it two or even four pounds less. Most men can draw a bow of this weight with reasonable ease and for that reason can fix their attention on the development of technique, or correct form. If an archer be under too great a physical strain it is very hard for him either to focus his thought on details or to coördinate his physical powers to accomplish them.

For shooting the American round this bow will always be heavy enough, even after the archer becomes expert, although many men prefer to use heavier bows, both because they enjoy more vigorous muscular effort and because they think, whether rightly or wrongly, that with the flatter trajectory of a strong bow they can make better scores. Nevertheless I believe that for distances up to sixty yards, except at the end of a York round, a man of average strength should not burden himself with more than fifty pounds. Of course there are many exceptions to this rule. Dr. Crouch is a man of extraordinary strength, who can walk on his hands, for instance, but he made the former practice record of 90-684 with a fifty-three pound

Shepherdson jointed yew. Professor Rendtorff made his equally wonderful 90-682 with a lemonwood by Duff which was heavier when he bought it but which he scraped down himself to about fifty pounds.

In the York round the use of a very strong bow is distinctly tempting and should be indulged in up to reasonable limits. If a man pull lower than the neck, or even if he have a tall tree behind his target for a point of aim, he may get on very well with a forty-two pound bow. If he use the same draw for 100 that he does for forty, that is, as high as the chin, he will find much greater satisfaction in a bow of from fifty to sixty pounds if he be strong enough to control it perfectly. The test of this is the tournament. A man may favor himself on his home range by selecting a suitable background but where favoritism is scrupulously avoided, as in one of the big meetings, the targets are usually so placed that there is nothing behind them but a distressingly low horizon and the limitless vaults of cerulean sky. Many a strong man has failed to equal his practice records by not preparing for this contingency, and has been obliged to aim high with a weak weapon when ten pounds more would have given him an aim on something definite. On the other hand there is nothing more fatal than to be overbowed. Any man may easily be decoyed into making this error, forgetting that because he can give a few mighty tugs when he is fresh it does not mean that he can last for a whole round. It is particularly an error which is apt to beset growing boys, whose muscles have not yet become as firm as their determination.

If a bow be for hunting it may be much stronger. Under the excitement of the moment, and for one or two shots only, a man who should shoot a forty-six at the target may loose a sixty or sixty-five pounder at a deer. Hunting arrows are so much heavier than target shafts that strength in a bow is very desirable for big game. For birds and small beasts a light bow is better.

A bow for roving, or for any of the games derived from it, should be as strong as one can pull. Only one or two shots are required and great distance is the important factor, at least in the first shot.

I know of nothing that demonstrates the fundamental difference in the musculature of the sexes more than archery. A girl can always outdance a man, can often outwalk him, sometimes can drive a golf ball as far but she can never shoot in his bow. Neither is there any reason why she should, except in roving, because sixty yards at the target and 120 at the clout are all she is required to do at tournaments, even though she may essay a few Hereford rounds for practice. Of course flight shooting is an entirely different subject and needs special tackle.

Very young girls of ordinary strength and children should begin with eighteen to twenty-two pounds. Twenty-five pounds, in the five foot six inch woman's bow gives an excellent cast for sixty yards. At thirty pounds most women begin to feel overbowed and beyond this weight they should proceed with caution.

Unfortunately the weights which are stamped on bows are only too often misleading and more than half the time err on the heavy side by several pounds. Why the bowyers are so untruthful about the weight has always been a puzzle to me but so far I have found only one whose weights were proven correct on my scales.

It is a very easy matter to test the weight of a bow for yourself. All you need do is to drive two strong spikes into a post, or wall, about three inches apart, lay the bow on them, measure twenty-eight inches, or whatever the length of the arrow is to be, from the back of the handle, not from the nails, make a mark there, hook a 100-pound spring balance on the string and pull it down as far as the mark. The pointer on the balance will then indicate the correct weight.

The color of a bow is a matter of personal taste. The great



majority are left in their natural tint, except for the varnish, or French polish, but I think the appearance of osage orange, lemonwood, lancewood and several other woods, may be improved by a coat of pure nitric acid. It does not burn the wood enough to make any difference in strength and it makes a rich, reddish brown hue without concealing the grain. If you are given to the arts of camouflage you can simulate the appearance of sap and heart wood by wrapping a wisp of cotton around a toothpick, or match-stick, dipping it in nitric acid and passing it along the bow, with the second finger sliding on the back for a guide, at about one-fourth inch from the edge, thus leaving a white back while you paint a brown belly.

As parting advice I would say to buy a weak and cheap bow to learn with, and spend your money on a good yew only when you can safely use it, keeping the first one to lend to the friends whom you will be sure to teach.

In considering the wooden bow, we have so far discussed only the bow of traditional English design which indeed, until quite recently, was the only kind supplied to the market. Americans however, especially the sort with high mentality who are attracted to archery, are not content to rest in the comforts of custom. As the result of research and experiment they have devised some new, or have reverted to old forms of bows that have great merit and possibly, in some cases, may prove to be better than the conventional type.

One of the first changes was to straighten out the curving contour of the belly by scraping flat the front and sides, thus making the cross-section an isosceles trapezoid. Harold Plowe of Peoria, whose ability as a maker of violins gave him exquisite craftsmanship, found in 1928 that the cast of his bow was not lessened by so modifying its lines and in the same year Rounsevelle sold yew bows of a similar pattern. The flat belly also reduced the tendency to chrysal.

The next step was to shorten the bow and thus increase its quickness. At least twenty years ago, many of us realized

that the full six feet were not always necessary in a bow that was meant for an arrow of twenty-eight inches and, as stated in the early part of this chapter, a few inches have often been taken with benefit from the total length of the standard bow. The recent adoption of bows that are relatively wider and thinner in the arms has permitted a still greater reduction in length. Such a cross-section puts the plane of neutral bending, or the plane of maximum shear, or the demarkation between tension and compression, so much nearer the face of the belly, thus reducing the thickness of the belly, that the total internal strain of the bow is more evenly distributed and the belly is less likely to be compressed beyond its limit of elasticity, or is less likely to chrysal. Professor George J. Higgins of the University of Detroit, an aeronautical engineer who is fascinated by the allied problems of archery, was a leader in this movement. His bows are as thin, short and wide of limb as many of the Indian models but he makes a thick and narrow handle to lessen the archers' paradox and give stiffness there, a feature which was usually, but not always, overlooked by the aborigines.

In Oregon, F. W. Peters of Salem and Rev. L. L. Daily of Monmouth worked out nearly the same design but they added the valuable feature of sharply returned or reflexed ears, smaller than on Oriental bows, perhaps only a half inch wide, two inches long and bent back at right angles, but by a curve having a two inch radius. Bows of this type have a marvellous cast.

These short bows were still curved in cross-section and it remained for Professor H. S. Rogers of Chicago to boldly make them rectangular. His typical bow has a jointed steel handle, which the Oregon bowyers sometimes use also. From nock to nock it measures fifty-six inches, made up of—upper limb  $26\frac{1}{2}$ , handle 5, lower limb  $24\frac{1}{2}$ . Of the upper limb an inch and a half is practically unbending, twenty-one inches is a slat  $\frac{5}{16}$  thick and lessening by a straight taper from  $1\frac{1}{2}$



## SNAPSHOTS

1. Rogers Bow at Canandaigua,  
Dr. Elmer
2. Large Bales at Avondale,  
Dr. Kellerman, Major Stickney
3. Bassa Wood Wand at Washington,  
P. Wilcox, Elmer, R. Thompson
4. Veterans,  
James Duff, Homer Taylor
5. Trio Tried and True,  
Crouch, Brush, C. Thompson
6. Three Centuries Plus,  
Dr. Rawlins, Culver, H. Plowe,  
H. Taylor
7. The End of a Perfect Seay,  
Cassius Styles



to  $\frac{3}{4}$ , and the last four inches is a narrow but thicker ear. Osage orange is his wood of choice, the other bowyers preferring yew. To still further shorten the string and thus increase the forward component of force exerted on the arrow, the angle of the string at full draw being more acute, the limbs are set by heat to a graceful bend with the concavity on the belly side. The resulting weapon looks strikingly like the composite bow when strung and also like many presumably wooden bows in French and Italian paintings done before the nineteenth century, usually in the hands of the social élite, as though they were things of value. I used a Rogers osage bow weighing only forty-six pounds in the N. A. A. and New York State tournaments of 1931. My point of aim was on the forty yard peg at eighty yards, half a face above the target at one hundred yards with 407 grain arrows and low on the target at the same distance with 326 grain arrows. After the sprightliness of that saucy scion of the hedge, my six foot yews seemed stolidly Victorian.

The idea of a bow of even thickness tapering in straight lines at the sides is supported by the mathematical calculations of Dr. Hickman. In his archery work he has proven for the first time a theorem which is so simple and of such wide application that one wonders why it has never been discovered before, to wit, that a flat body with sides tapering evenly from the middle to a point at the ends will bend in an arc of a circle no matter what the width or length. That a true arc is the best shape for a bow to assume in full draw has not been proven, but at least it seems evident that in such a curve every portion of the bow is working. I have a hickory bow of exactly that design, made for me by a Winnebago Indian, but it is too weak to judge by. It is, one of the easiest possible ways to make a bow, technically, but the best dimensions have still to be worked out.

What will be the ultimate form of wooden bow no one can say. It does seem fairly certain that reflexed ears give an

increase of cast. To me they suggest the final twist of the wrist that means so much in pitching a baseball. George Nichols, an archer of enormous experience, had a seventy pound yew of Daily's that would just do three hundred yards. Daily then reflexed about two inches on each end and it did seventy-five yards more. Other factors have to be considered, however, such as three months more of seasoning and, in a sense, the shortening of the casting arm. Prouty won the N. A. A. flight shoot in 1931 with a bow that had Daily ears, but Daily himself won it the year before with a bow without ears and made almost as good a cast. Both bows were straight self-yews with round bellies.

The trusty old standard yew must not be jilted too lightly. There are many different factors in a bow that make for steady shooting at the targets and it has been proven to hold most of them. It has stood the test of centuries.

The arrow is even more important a part of the archer's artillery than the bow, for, as the Seminole bowman with whom Maurice Thompson hunted in Florida said, "Any stick do for bow; good arrow damn heap work." This is a lesson that every beginner must learn.

If he blame his missed shots on his bow he is probably wrong in his diagnosis of the source of the trouble but if he blame the arrows he may be right.

In spite of this I would advise the beginner to get a dozen cheap self arrows. The first dozen do not last long. It is amazing to see with what sagacity they search out every stone, target leg and tree to hurl themselves against, either nose on or sideways. As with the bow, buy cheap ones, break most of them to pieces in learning your technique and then get two dozen of the best matched arrows that the market affords and if any of your old ones be left lend them to your pupils or friends.

Many kinds of arrows are now sold by American fletchers. I will describe the most important ones, though much that will



be said in the chapter on their manufacture need not be given here. They are very different in quality. Some are made of birch dowels and fill the vast need of an inexpensive arrow for use in camps, by beginners, in schools, by boy scouts and so on. There is a large field for the sale of thousands of dozens of such arrows and their manufacture should be encouraged by every archer. However, most of these arrows are not straight enough to make the best scores, although under special care in the making there are a few exceptions. The price of shafts of this sort is very properly kept low.

Self arrows of light wood are made either by hand tooling or by improved mechanical means, which give as good a result. In no department of archery has opinion changed more than in regard to them. Twenty or even ten years ago I thought that they were fit for nothing but toys. Now they are used by many of the best archers in America, including Hoogerhyde who made the N. A. A. record for the American round with them. Of course they vary greatly in quality according to the care and skill brought to their making, the poorest being no better than dowel arrows. Correspondingly, they sell in a wide range of prices, though the cost should always be less than for the footed. The best feature is their extreme lightness, with the agreeable concomitant of low trajectory, and the worst is their liability to fracture close to the pile. The danger of this accident can be minimized, however, by the old expedient, patented in 1879, of coring a wire nail or other kind of slender rod into the last two or three inches of the stele.

The standard tournament shaft differs only in being footed with hardwood. Both kinds of arrows should be made of what the English call "deal," which I shall discuss more fully, should be feathered with meticulous care, should have a nock piece of horn or similar material, and above all should be perfect in spine, weight and balance.

It does not seem to me that it makes very much difference

as to which kind of hardwood is used for the footing. Make your own selection, guided largely by your preferences in color.

As for the light wood used in the stele there can hardly be said to be such a wide choice. The old writers mention a long list of woods out of which arrows were made in their time but Horace Ford made a clean sweep of them all and said with emphasis to use nothing but *red deal*, even writing the word in italics. Deal is an ancient word in the Germanic group of languages and in its various forms means a board. In modern times it has been restricted to mean boards of fir or pine, similar trees in structure, and so, to us Americans who never use it, it seems too general in its application to be much of a guide. To add to the difficulty, deal is also used in Britain as the name of a soft wood measurement. A deal in England is a piece of pine wood sawn nine inches wide and two to four inches thick, not less than eight feet long.

Red deal, however, is specific. It means the *Pinus sylvestris*, which may be called Scotch pine or Norway pine according to where it grows. It is a noble tree, found from the British Isles to Kamchatka and as far south as the Pyrenees. Like all trees it grows more slowly in cold climates and on the mountain sides of Norway about four centuries are needed to make a tree three feet thick. For this reason the wood of the north is stiffer than that of trees of the same species which grow in milder climates and is better adapted for arrow shafts than any other material which was available in the middle of the last century, when Ford wrote.

Our best American rival is the Port Orford cedar, about which I quote the Smithsonian report: "Port Orford Cedar—*Chamæcyparis lawsonia*. Range—Coast region from South-western Oregon to California, extending inland about forty miles. Wood light, hard, strong, very close grained, durable, easily worked."

Another excellent western wood is Douglas fir or Pseudo-

*tsuga taxifolia*, occurring in the Rocky Mountain region, on the Pacific coast and northward into Canada. Commercially it is called Oregon pine. Professor Bror L. Grondal, of the University of Washington, says: "Douglas Fir is the strongest resinous wood, pound for pound, that has ever been tested. It seems possible that this extra strength is due in part to the spiral reinforcements which are found in the cells. Yew is the only other American soft-wood having similar reinforcing." Robinson says: "Rounsevelle's statement that this wood parts along the juncture of the hard and soft wood after considerable use, I can confirm."

White spruce or *Picea glauca*, found in the White Mountains and north into Canada, and red spruce or *Picea rubra*, of our Eastern states, are probably the best arrow woods that the Atlantic seaboard can provide. Black spruce or *Picea nigra*, is too small and knotty for arrows.

All of these woods not only make good arrows but they make first-class arrows, the very best that can be bought, always supposing that the particular specimen be a good one.

Another excellent sort of arrow is made of split bamboo, like a fly rod, and within the classic meanings can be called neither self nor footed, though it really contains the best characteristics of both of those forms. The physical principle is that of a strong but flexible tube which is closed for a few inches near one end. Owing to the stiffness of bamboo, the pipe-like walls of the stele are not more than one-sixteenth of an inch in thickness until within a few inches of the pile end when, in order to give weight and extra strength, they swell to meet in the middle and thus form a solid bar. The lumen is filled with a core of Port Orford cedar. Such a shaft can be produced only by the special facilities of a fishing rod factory or else by an artisan of the highest skill in joinery by hand. At present the same firm that makes the bows of split bamboo is the only establishment to manufacture them. The finished product is of less diameter than is practicable with

either self or footed arrows that have steles of light wood but, nevertheless, it has wonderful spine, keeps its shape well, is hard to break, flies low and true and in all respects is the peer of any arrow on the market. I have seen several Americans of over six hundred made with them.

In this day of experimentation it is inevitable that different inventors should have attempted to make arrows of some form of metallic tubing, hoping thereby to facilitate manufacture and to secure more exact similarity than is possible with wood. They have now reached a point where steel arrows are equal to very good wooden ones but, as yet, they are no better.

The first metal arrows ever made, so far as I know, if we disregard poetical allusions to "arrows of brass" and the like, were a dozen which Homer Bishop of Chicago constructed of soft aluminum tubing and brought as curiosities to the national tournament of 1911. As he had never shot them himself he asked me to try them but, when I did so, they bent around the bow and proved to be impractical. The next that I saw I have vivid cause to remember. At the preliminary practice for the national tournament of 1927 at Boston, I was scoring so poorly that Phil Rounsevelle invited me to change to a set made of duralumin tubing, arguing that at least I could do no worse. Being new and straight and of sufficient spine they helped me greatly and gave me a win in the American with the second best score I ever made in a national tournament. Nevertheless, their one intrinsic fault soon disclosed itself, a tendency to pass the limit of elasticity and remain bent. Because of this their manufacture was ultimately abandoned and thin walled steel tubing was substituted as a material. This was a decided improvement and led to much wider use. In 1928 C. J. Speidel of Rochester, N. Y., made the highest single round in the national tournament with them, an American of 611. Yet their only shortcoming remained the same, a proneness to stay bent if they were thrown too

much out of true by some such accident as entering the target slantingly in a side wind.

Improvement in their manufacture has been constant, however, until now, through skillful heat-treating and tempering of the best quality of steel, they have reached a high degree of excellence. They come in different weights of from 320 to 380 grains and are matched in sets for ascending strengths of bows, as the selection of correct spine is an important consideration in their purchase. Plated in nickel or chromium, involving a difference in price, they are very beautiful to the eye. The best proof of their capabilities is afforded by the splendid scores which have been made with them.

Besides the bow and arrows the only thing that is absolutely indispensable to an archer is the string. By far the best ones on the market are made in Belgium. The process of manufacture I do not understand at all. If they are teased apart they seem to be made of unspun hemp rubbed down with glue. The eye and noose are formed of three twisted strands, just as our home-made ones are, but the foundation of the whole cord is the fibre itself and not spun thread, such as we use. They vary in strength from a delicate little string to a heroic cord three-sixteenths of an inch thick that would hold a bow of far more than a hundred pounds in weight. Most American supply houses import them but those archers who wish to order directly from the makers can send to the following addresses, which are given by the Belgian Chamber of Commerce in London: Vastemans fils, Chaussée de Bruxelles, Melle, Belgium, and M. Daems, Rue de Roi Albert 27, Diest, Belgium.

Strings of steel are furnished on bows of that metal. They are formed of three strands of very fine piano wire and, considering the nature of the material, are astonishingly light. Weighing one for a five foot two inch bow, fully served and with soldered and leather-wound eyes, I find it to be exactly 270 grains. An ordinary Belgian string for a six foot bow



weighs 250 grains; not so great a difference as one might expect. The only reason for whipping them at the nocking point is to ease the drawing fingers and to fit the ordinary arrow nock, as they will not wear out at that critical spot. That fool-proof feature makes them a comfort to one who has charge of institutional work. If metal meet metal at the eye and bow nock the wire will wear through, a contingency preventable by either interposing a piece of leather or by serving the eye. Whether they shoot as well as hemp or linen strings is open to debate, though it is so affirmed by the makers and assented to by some competent and impartial archers.

The best strings in America, that I know of, are made by Shepherdson and at my request he very graciously wrote a full description of his method for this book. It is so complete and perfect that I see no reason for making any comments on it except to give it the praise it deserves.

A hunter may, and can, so harden his fingers that he can shoot his occasional arrows at game without any protection to his skin. In a few rare instances men have shot through a national tournament with bare fingers, just to show what hardy fellows they were. There is no sense in it, however, and the pain soon becomes so great that even a Spartan would find his accuracy impaired. The Belgians wrap the cord above and below the nocking point with soft cotton string to a thickness of perhaps three-eighths inch. I have given this method some trial, though not exhaustively, and I have not felt that I could get nearly so clean a loose as with finger-tips or a tab.

The majority of English and American archers use finger-tips, either sewed on a glove or fitted like thimbles of various patterns. I used separate tips for several years but gave them up for the glove, which, however, I think is no better. The chief consideration in the selection of a glove should be that it fit tightly jammed against the ends of the fingers and to make sure of this most people should buy short-fingered, or

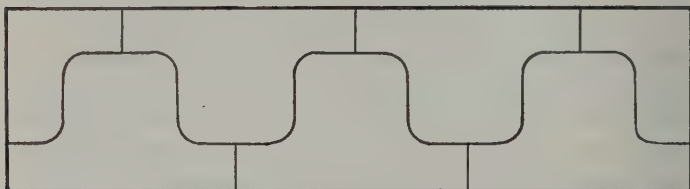


cadet, gloves. The tip to be sewed on is cut from horsehide or calfskin, is wide enough to reach from one back seam to the other, long enough to reach from the tip where all the seams unite to the middle of the second digital phalanx and rounded at the top to conform to the shape of the finger. Before sewing them on they should first have their edges skived down and then be stretched and pressed over a little wooden form shaped like the end of a finger. It is still better to carve out a two-piece mould, lay the wet leather in it and leave it under pressure over night to get a good set. In sewing, take one stitch through the extreme tip to show the centre, then thrust either a finger of the left hand or a shaped stick in the glove finger to fill it out and mark with a pencil where the baseline should be. After that remove the stick and sew on the tip by whipping it over and over with fine stitches of linen thread. To make the fit near the top take little tucks at each stitch by making the needle pricks farther apart in the tip than they are in the glove. The back seams should be followed all the way around.

Some archers like a parrot beaked tip sold in the shops and made in England. While I think that every man should act according to his taste where personal comfort is so nearly concerned, my own experience has been that unless my fingernails are either uncovered or at most pressed on very lightly, as by the kid of a glove, they soon get very sore.

The best tip that I know of is simply a small bit of leather with the bottom elongated into two short straps which can be sewed together on the back of the finger. They are so easy to make that I often cut out a set for a friend in a few minutes before we shoot. To make them take a piece of leather two inches wide and as long as you please, though six inches is enough for one set. Draw a line one-half inch from each edge and parallel to it. Mark off the one-inch space between these lines by cross-lines at every one and one-fourth inch. To make the cut use scissors; start on one parallel line and cut to

a cross-line, follow the cross-line to the other side and cut along that parallel to the next cross-line, follow it over and so on. You will then have two strips of tips which you can cut apart, fit over the finger and sew. If the skin become sore in spite of the tips protect it with a layer or two of adhesive plaster.

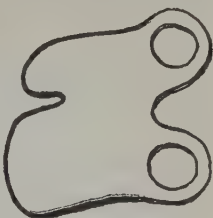


Making Finger Tips.

When Major G. A. E. Chapman, D. S. O., of Ottawa, who was champion of England in 1922, spent the winter of 1927-28 at Pinehurst, N. C., he introduced to America the ancient English tab. Since then it has grown steadily in popularity until now it is used by many of our best archers, including Palmer, Crouch and Brush, the last making the American hundred yard record of 56-270 with it in 1931. It is simply a flat piece of leather, genuine Cordovan being the best,  $2\frac{3}{4}$  by  $3\frac{1}{4}$  inches in size, with holes at one edge for the first and third fingers, a depression between them for the second and a shallow slot at the opposite edge for the nock end of the arrow. The exact shape can be understood only from a drawing. Its advantages over tips are the close

approximation of the fingers, a smooth surface on the string and greater comfort. It is wholly meritorious. For an emergency, such as the need for quickly fitting out a roving party or group of pupils, very serviceable tabs may be cut from automobile inner tubes.

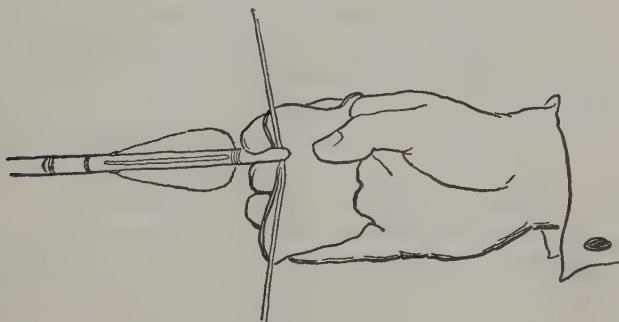
The kind of bracer to buy depends somewhat on the physical configuration of the archer's arm and somewhat on the use to which it is to be put.



Tab.

For hunting through underbrush it is best to have a large, strong cuff of leather or rawhide which is laced on the back of the arm, holds the sleeve tightly and will not catch in twigs, slip around on the arm nor get loose.

Some bracers are made of fibre, without lacings or other devices to fasten them, and are expected to stay in place by their own springiness. In cold and dry weather these are all



Tab in use.

right but if they be worn through a protracted rain, or thoroughly wet as by falling into a stream or worn on a hot day until they are saturated with sweat they will become soft and will no longer hold tightly to the arm.

For target shooting many of these conditions do not have

to be taken into account. In the cold weather, when one wears a coat while shooting, or in England where they are worn for traditional reasons, a cuff bracer is of advantage because of its firm hold on the sleeve. Yet a strap bracer does just about as well and is rather neater in appearance.

One must not forget that the string touches in only one place and that no great width of protection is required to keep it from hitting one's skin. In case of emergency even a lead pencil tied to the front of the forearm or held in place by a couple of rubber bands will give perfect protection. If an archer suddenly discover, at the beginning of a match, that he has forgotten his bracer, all he need do is to go to the nearest bush, cut a twig or two and stick them on his bare arm with adhesive plaster.

If an archer have a thick forearm which is apt to be hit by the string, unless he be very careful to keep it in exact line, it is well for him not to add to his girth at that point by using a bracer of heavy leather. In such a case one may be cut with tin shears out of sheet aluminum and pressed to the shape of the arm. It need not be more than an inch or inch and a half in width, with ears left on the corners in which holes are punched, or drilled, for elastic cords. I used one like this, but made of copper, at the Eastern tournament in 1925. Most of the archers had never seen nor *heard* a metal bracer and the loud noise made by the blow of the cord upon it kept many of them turning around to see what was breaking.

Sometimes leather bracers are made of split leather with metal inside.

The bracer that I like best of all is made of hard fibre. It is no thicker than blotting paper and therefore does not catch the string, but it is so stiff that no pain can be felt through it. Archers who are not skilled craftsmen but who wish to present some piece of home-made tackle to friends or youngsters can revel in an orgy of making dozens of these bracers. The fibre comes in a four by eight foot sheet that

costs less than a dollar and lasts until one is tired of it. It can be cut to one's favorite pattern with either shears or strong scissors. On the two edges that are to be laced together the shoemaker can set two or three shoe-hooks or a box of the hooks and a tool for rivetting them can be bought very cheaply of any dealer in shoemakers' supplies. I use common rubber bands rather than lacings as they are simpler and prevent the bracer from slipping.

Personally I like to use a quiver but many archers simply put their arrows in a trousers pocket. If you do use a quiver the English style which hangs from the belt by two straps and is exactly large enough for six arrows is quite all right. The only good quiver made in America at present is of soft leather and has a strap-loop on it through which the belt may be passed or by which it can be strapped over the shoulder in hunting. It is very good, although for target work it has the small disadvantage that it holds the feathers so close to one's back that they are likely to be mussed by the clothing.

If one do not care to carry his arrows on his person while at the targets it is a simple matter to stand them in some sort of a rest. The simplest kind is made by turning a loop in the end of an iron rod, bending it over at right angles and sticking the rod in the ground.

Although it is not literally a part of an archer's tackle the target stand may well be considered here. Stands are made of wood or iron. An iron stand as it comes from the shop in pristine nakedness is unfit for use, because of the frequency with which arrows break against it. However, if one take the trouble to cover the legs with rubber hose, or wrap them well with several layers of tarred string it becomes less of a menace.

The best stand is also the cheapest to buy or the easiest to make. It consists simply of three pieces of soft wood one by three inches and six feet long. Near one end a half-inch hole is bored and the three are loosely bolted together so that they may be spread out in a tripod. No special notch is needed at

the top as the string of the target may be simply rested on the ends and will never slip off. To keep the stand from blowing over in a high wind tie a single rope to the apex of the tripod and drive it taut to the earth with a wooden peg. Stands are usually painted green but sometimes with the bright colors of the target face so that when a number are standing in a row the archer will not shoot at the wrong target.

The official or standard target of both England and America consists of a painted face sewn on a back of straw, called a bass. The face is four feet in diameter, with an added petticoat of an inch or more. It is divided by concentric circles into five regions, of which the central one is a bull's-eye of nine and three-fifths inches diameter, and the others are four and four-fifths inches in width. They are colored from within out, gold, red, blue, black and white and are given values of 9, 7, 5, 3, 1.

There is a good mathematical reason for these figures which was pointed out to me by my old friend and classmate in Princeton '99, the late Dr. Oliver Dimon Kellogg, Professor of Mathematics at Harvard. I may add that while I have heard this question argued among archers for a score of years he is the only one, to my mind, who went to the gist of the matter. In fine, the object of shooting is not to hit the gold, but to hit the pin-centre. A hit there is 100% perfect. A miss of the whole target is 0%. Since the direction of error makes no difference, the rings are merely conveniences for measuring the deviation from the pin-centre, or rather, the nearness to that point. As there are five rings, the width of each includes twenty units of percentage, as: white—0% to 20%, black—20% to 40%, blue—40% to 60%, red—60% to 80%, gold—80% to 100%. The average percentage values of the rings therefore are 10%, 30%, 50%, 70%, 90%, or the ratio of 1, 3, 5, 7, 9.

It seems to me that another way of getting at the same figures may be this: The area of a circle =  $\pi R^2$ . Therefore



areas of circles are to each other as the squares of their radii. The area of a ring is that of the outer bounding circle less that of the inner one. Therefore, taking the area of the bull's-eye as unit, the areas of the successive regions are 1, 4 - 1, 9 - 4, 16 - 9, 25 - 16, or 1, 3, 5, 7, 9. This means that of a very great but evenly distributed number of hits on the target, for example as if grains of dust were blown on it by the wind, ideally nine times as many would hit the white as would hit the gold, seven times as many the black and so on. In other words, a hit in the gold would be nine times less likely than one in the white, in the red seven times, in the blue five and in the black three. Therefore the modification of the arrow's path by the archer should credit him with nine for a bull's-eye, seven for a red, five for a blue and three for a black as indicating the extent to which he had improved on the laws of chance.

The reason why the standard target is made with a four foot diameter is that centuries of trial and error have shown it to be just about such a mark as a good archer ought to hit at one hundred yards.

In buying a target it is a good plan to test the solidity of its bass by trying to bore your index finger through it. If you can do so it is not good enough.

The face should be made of sign cloth, which takes the paint perfectly and is not shiny, and the paints should be dull. Nothing is more annoying than a target which glistens dazzlingly in the sun.

For a cheap, satisfactory and quickly made practice face I often use unbleached muslin colored with oil crayons. It does not tear so easily as sign or oil cloth and the colors not only remain for a sufficient time but they are faint enough to show the position of the arrows clearly. By the way, for this reason of visibility, the by-laws of the N. A. A. specify that the blue of the standard target shall be of a light shade. Archers who shoot after the day's work, in a bad light, should

not use a colored face because the arrows cannot be seen in it. A white face having a black bull's-eye and fine lines to divide the rings is better, though it may not legally be used in tournaments.

If you wish to make a target bass yourself, a feat which requires great strength of hand, be sure to use rye straw, which has a much longer and stiffer stalk than wheat. Threshed straw can be bought almost anywhere, in bales, but unthreshed straw, which is much better, is not so easy to find. One place where it may be bought is a factory of horse collars.

To begin a bass squeeze as much straw as you can to a four-inch diameter and bind it with strong tarred cord, such as gardeners use. When the length is about two and a half feet double it over on itself and sew it firmly together with a whip stitch, using the tarred cord and a large curved sacking needle eight inches long or a mattress needle. By feeding more straw into the rope, always keeping it four inches thick, and sewing round and round, you finally, with much sweat of the brow, find that the diameter has reached four feet. In principle it is easy to understand but in practice it is hard to do. The main point to remember is that the first piece, in the centre, must be long. If it be short and sharply turned on itself the middle will be weak. With such an elongated beginning an ellipse would be formed if the straw were always kept of the same width but the shape can be brought to circular by using judgment and widening, where required.

It has always seemed to me that target-making would be a good trade for blind men. It is much easier than chair-caning and I should think would produce a better income.

Some of the best English manufacturers of targets use a simple mechanical device which ought not to be difficult to construct and which I think would not only reduce the physical labor very much but would also result in a tighter and better product than would be possible by the use of the hand only.

Perhaps it explains why the English targets can be so thin and yet so firm and lasting.

It consists primarily of two wooden wheels, each more than a foot in diameter and with heavily concaved edges about four inches wide. These wheels run edge to edge, one on top of the other, like a rolling mill for iron.

They are slowly turned by a boy, who also feeds in the straw. As it comes out of the groove, compressed into a hard rope, it is immediately sewn down to the target by the chief maker. Just how these wheels are mounted, or how the machine is kept close to the work, I have not been able to learn,



Butt Shooting, from the *Luttrell Psalter*, 1340.

but I should think that any ingenious person, knowing the general principle, could work out suitable details without great difficulty.

A target should be put under cover when it is not in use because a few alternate wettings and dryings will ruin it in an unbelievably short time. If circumstances require that it be left out, as in the case of ladies who find it too heavy to lift, it should be covered with oilcloth or tarpaulin.

On permanent ranges it is well to use butts. They are easily made of three superimposed bales of straw, kept from falling by a piece of pipe or an iron fence-post driven behind and tied fast. As the three iron wires which fasten a bale of straw are liable to break, through rust, or accident, the bale should be reinforced with bands of galvanized wire before the

face is sewed on. While the ordinary straw bale of commerce is four feet long over all, yet the ends of it are soft and irregular and will neither fill out the full width of the standard target face nor stop arrows that hit near the periphery. The Avondale Archers, who are also farmers, correct this by making oversize bales in their own presses. Those of us who have no such obliging agrestic friends must either ignore the loss of a few inches of the white ring at each side or else set up other bales in juxtaposition. A four bale butt, with the narrow sides showing, will conceal the wires and have a firmer base.

The old English butts, which were nine feet wide and seven feet high and four feet thick, were made of sod, a very good but expensive thing in modern times.

## XI

### MAKING A YEW BOW

BY EDWARD W. FRENTZ

PICTURE to yourself, you lovers of the longbow, a young fellow in his early twenties standing on the threshold of a dimly-lighted shed, the door of which has just been opened, and letting his eyes rest upon what seems to him an innumerable army of six-foot yew staves, all in the rough, with the bark on, but all thoroughly seasoned. In his heart is singing the knowledge that one of those staves is his, and, what is even more alluring, that it is his privilege to choose it from among all of them. Having made and used bows of other material for some ten years, he has at last determined to have a yew bow. The catalogue of one of the great sporting-goods houses of the day had advertised "self-yew bows of our own make," and reasoning with marvellous accuracy for one of his age, the young man had reached the conclusion that if the house made yew bows it must have yew wood to make them of. Accordingly he has journeyed from the little Massachusetts town where he is teaching school to New York City and there interviewed the head of the firm, only to learn that the wood was all at the factory in Rhode Island. But he came away from the interview with a note to the manager of the factory containing permission to pick a stave for a price named, and now, on the following Saturday, his first free day, he stands at the open door of the shed. The Argo has come to port: he has found the Golden Fleece. It is now forty years ago, yet never since then has he had a more delightful thrill or known a happier day than the Saturday spent in that dim and dusty shed in Pawtucket.

There are several reasons why the fascination of making

bows never loses its hold upon those whom it has once gripped. To the man of sentiment and imagination there is an indefinable attraction in doing something that his prehistoric forebears did in the dim ages when the whole earth was a wilderness and game was the chief source of food, and in doing it with the same tools; for our saws and planes and draw-knives and spoke-shaves and files and scrapers are after all but modified—and more efficient—forms of the flint knife, the obsidian scraper, the piece of sandstone and the strip of shark skin. There is also the anticipation of ownership. A good bow is an alluring weapon and a delightful implement of sport, yet hard to buy; and a fine yew bow, a thing of beauty in the hand and a joy in the field, is almost impossible to find ready made in the shops. Finally, there is the satisfaction of working out a difficult problem, for every stave of yew is a new study. One stave differs from another in character as one star differeth from another in glory. Each must be handled according to its individual characteristics. The game is always new.

It is of little use to tell the amateur who wants to make a yew bow that he should choose "a perfectly straight stave at least six feet long, of fine grain, dark color, and free from knots, pins, and pitch-pockets." Unless he lives in Oregon or California, or can go there and cut his own timber, he must depend for his stave upon what some woodsman sends him, and make what he can of it.

Nevertheless he should know the chief quality or qualities to look for, and the way to learn them is so simple that it is amusing to see how persistently writers on bow-making have ignored it.

What you chiefly require in a bow is cast and durability. If you are to have them in the bow they must first be in the wood, and no test that the eye alone can make is to be trusted. The stave may be dark-colored, fine grained, free from knots and other blemishes, and yet be of little worth. The only trustworthy test is that of the knife. Shave or split off long,



thin slivers from the heart wood on the inside of the stave, and subject them to the same treatment that the bow will get; that is, hold the butt end between a thumb and a finger, bend the other end down *toward* the side that the knife blade just freed and loose it sharply. Repeating that a few times will show you both how tough the wood is and how springy, and that is all that you need to know in order to foretell the quality of the bow. The reason that you should bend the sliver so that the newly cut surface shall be the concave side is that the knife almost always leaves that side full of little cracks that will break the sliver if you bend it with them on the outside.

The best yew, generally speaking, is that which whittles most easily. The shavings follow the knife from end to end of the stave without breaking, and you could make a good bow of such a stave even if you had no tool but a knife. Indeed, one bow that I made from such wood thirty-five years ago with no tools but a pocket-knife and a file is still in use, and has won the flight shot for women five times in national tournaments.

But there are also tests of the eye that should not be neglected. Freedom from knots, pins, checks, pitch-pockets and other blemishes is, of course, greatly to be desired, and so is a reasonable fineness of grain. A rich, dark color adds much to the beauty of the finished weapon but has no other value.

The quality of grain that I like best is that in which the line of demarkation between sap and heart is sharp and clear, and the lines of annual growth when viewed from the side are distinctly marked, sharply separated one from another, and with none or few of those darker flecks running at right angles to the grain that cause some woods (beech, for example) to be known as "shot." Wood that has flecks usually makes a bow that is light in the hand and soft and "sweet" to shoot, but generally it is lacking in stamina, is inclined to follow the string and is seldom very long-lived.

The worst yew in the world is the yellow, coarse-grained kind from which even a sharp knife can hardly cut a shaving

of even thickness, because the blade keeps dipping in or running out. The sap-wood is yellowish, and when cut shows distinctly marked "feathers" like those in the freshly-cut sap-wood of green hemlock, and is hardly distinguishable in color from the heart. It is wood that grew at sea-level or near it, and is sure to show its base origin in its character, for it will be slow and weak of cast, will warp and twist like a fresh-caught trout in the frying-pan, and will take on a new shape with every change of temperature or humidity. If you are so unfortunate as to get any yew of that kind, even as a gift, put it straightway into the fire. Thereby you will save the time it would have taken you to make a bow of it.

Two other things should, if possible, be taken into account in judging yew: the time of year at which it was cut and how it has been seasoned. The first you cannot tell from the looks: you must take the word of the man who cut it. My own preference is strongly for winter-cut wood. It seems to me to be stiffer, more virile, more durable, and to keep its shape better. As for treatment since the wood was cut, you can usually tell whether it has been seasoned in running water by a certain gray tinge in the sap-wood and often, indeed nearly always, by a purplish stain running along where the sap-wood joins the heart. Such wood has lost something. The horse may have been "broken," but his spirit has been broken, too. He will do your bidding, but he will do it in a half-hearted and listless way. A bow made of water-seasoned yew is well enough to potter away with at a target in the American Round; indeed, it is usually steady in the hand and pleasant to shoot, but it will follow the string and be deficient in cast at the longer ranges. The late Mr. Barnes used to maintain that a bow made of wood thus seasoned would not go down in weight in hot weather. The reason probably is that it loses so much in the first few days' shooting—assumes such a stooping and senile shape—that there is no room for any further decline.

I believe that there is no other way to season yew for bows

so good as letting it dry naturally, in the air, but the five years customary with English bowyers is by no means necessary. Leave the wood, with the bark on and the ends painted, for three or more months in a room where the sun cannot strike it and where there is no artificial heat. Then remove the bark; and as you will probably have to make a spliced or grafted bow, since six-foot staves are seldom to be had, saw your billet in two, lengthwise, with due regard to whatever flaws may appear on the back, reduce the two halves nearly to the size you want them, and leave them for another two or three months in a room that is warm but not artificially over-heated, such as an attic in summer. They will then be seasoned sufficiently to work.

The first step in making a bow is to form the back of each stave by reducing the sap-wood with a sharp draw shave to a thickness of a quarter of an inch. If it was not thicker than that to begin with, remove nothing but the bark. The main thing is to *follow the grain* and reduce it evenly. Every break in the continuity of the grain of the back is a source of weakness and the possible birthplace of a sliver. The humps and hollows that may result from following the grain will do no harm. If there are small knots that cannot be avoided, "raise" them; that is leave a little more wood round them, so that they stand up like little pustules.

Having made the back of the staves flat across and straight or undulating lengthwise, as the wood dictates, square the staves to a diameter of about an inch and a quarter in both directions, that is from sap to heart and from side to side; the size must depend somewhat upon the density and stiffness of the wood, of which you can judge by whittling it. On the back of each stave draw a line lengthwise through the centre.

Making the splice for the handle requires accurate laying out and careful workmanship, for the joint must be perfect or it will give. From thin, tough cardboard cut a strip as wide as the staves and two or three feet long. Draw a line

lengthwise through the centre of it and about midway between the two ends lay off a space four inches long by drawing lines at right angles across the strip. Within that space of four inches draw a W as wide as the strip and four inches deep, having all three of the entering angles equal to one another. With a sharp knife cut along the lines of the W until it separates.

You will now have two strips of cardboard that when placed together fit accurately one to the other and form a continuous strip, as at first. Paste one of them on each stave, with the points of the W flush with the end of the stave and the centre line on the cardboard exactly coinciding with the centre line down the backs of the staves. If now you cut the wood accurately to the lines of the W the splice will fit and the glued stave will be straight.

You can best do the sawing in a metal mitre box held in a vise. Set the guide to cut at right angles and clamp the stave to the back of the box in such a position that the path of the saw will lie along one edge of the W. When you have cut that edge, shift the stave to bring another edge in line, and keep on till you have cut both parts of the W. The two staves should now fit into each other and form one straight stave six feet and an inch or two long. The best saw for the work—in fact the only one that will do a good job—is a sharp backed saw wide enough to reach the bottom of the cuts and filed as a professional saw filer will do it if you tell him you want it to cut diagonally at a long slope.

I have never been able to see why, as some bow-makers advise, the W that forms the splice should be carried only to within an eighth of an inch of the edge of the stave instead of to the edge itself. The only possible advantage is that it obviates shortening the outside arms of the splice if the width of the stave prove too great for the desired weight, and it has disadvantages that more than counterbalance that. The direct cut across the grain for an eighth of an inch on each side

weakens the joint by twenty per cent., and if the two square ends on each side butt together, as in a neat joint they should, the butting exerts a powerful prying force that tends to open the joint. It is unscientific and unnecessary.

If the splice as it comes from the saw does not fit, it will be necessary to bring the surfaces into contact by filing them or grinding them down with sandpaper. Since knife files thin enough to reach to the bottom of the cuts are hard to find, the sandpaper offers the easier course. Plane strips of tough wood twelve or fourteen inches long to a width of an inch and a half or two inches and a cross section like that of a thin knife blade, and on one side glue rather coarse sandpaper, say No. 2. Make some of the strips right-handed and some left, but leave one face of each strip bare, as in a file that has a "safe" side. With such floats you can reach the bottom of the cuts and work the surfaces to a perfect fit.

Glue is the bow-maker's best friend or his most insidious enemy, according as he selects it wisely and uses it right or otherwise. There are but two kinds that he can trust in the joint of a grafted bow. One is that which comes in hard, golden-brown translucent sheets—whether it be American, French or German does not matter; the other is the waterproof casein glue that is made from sour milk, and that comes in the form of a fine white powder like plaster of Paris. It was first produced, I believe, at the government laboratory at Madison, Wisconsin, and was extensively used on the woodwork of aeroplanes during the war. Besides great strength it has two other advantages: it is used cold and it sets very slowly. As evidence of its waterproof quality, I may say that after soaking in hot water for two days a joint that I made with it five or six years ago, I was unable to loosen its grip, and finally had to saw the joint apart. Directions for using the glue come with it and should be closely followed.

If you use the common sinew glue, put a little isinglass with it—say perhaps a tenth, but don't confuse isinglass with mica.



By isinglass I mean the product made from the sounds of a fish. Even by itself it is one of the strongest adhesives known, and a little of it mixed with common glue makes the glue less brittle.

Break up the glue into pieces that will lie flat in the inner receptacle of a double boiler type of glue pot, barely cover it with cold water and let it soak over night. Then bring the water bath to a boil and keep it hot till you are done with it.

The best English bow-makers use only newly-melted glue for the joint in a bow handle, but my own preference is for the second heating. The glue is then better amalgamated with the water and of a more even thickness. When ready to use it should be about as thick as good molasses (if there is still any such thing in existence) in the summer. Have both halves of the joint as hot as you can get them, spread the glue over all the surfaces that are to be in contact and bring the faces of the joint together instantly. On each side of the joint place a strip of hickory or other tough wood as wide as the bow is deep, and four inches long, and then apply all the pressure that you can get from three five-inch iron clamps. As you begin to tighten the clamps, see that the bow lies straight, one limb with the other; and, if the shape of the wood permits, that the limbs set back a little in the handle. In other words, "sink" the handle a bit; it makes a better looking bow.

Having made the joint, put the bow away for three or four days, or better still, a week, in a dry but not too hot room, and let it alone, the clamps still on it, of course. The outside surface of the glue may seem hard long before that, but it takes the inside longer to dry than you would suppose.

At last comes the glad day when you can begin the work for which everything so far has been only preliminary: the actual making of the bow. As yet you have made only a six-foot stave.

Plane off the excess glue from the sides, back and belly of the stave, and sight down the back of it to see if the two longi-



tudinal lines on the backs of the limbs now form one straight line through the whole length of the stave. If they do not, erase them and draw a new one. We have purposely left the limbs of full width clear to the ends so that we should have something to "come and go" on if the stave should not be quite straight after the limbs are glued together.

Now at a point at one end of the splice or a very little below it, draw a line across the back, to mark the centre of the bow. From it in both directions measure off three feet and one-half inch, and saw the stave off at those points. The half-inch allowance is for those portions of the bow that will enter the horns beyond the nocks; thus the bow will be exactly six feet long from nock to nock. In laying off the limbs, it is better, if the wood permits, to let the two-point end of the splice—the end that corresponds to the bottom of the W—come at the upper end of the handle, since that is the point of greatest stress. So placing it makes a little stronger joint, but the difference is slight and the arrangement may be disregarded if the length or character of the limbs makes it inconvenient.

I am aware that in advising that the upper end of the splice, or a point very slightly below it, be made the centre of the bow instead of a point an inch or an inch and a quarter below it, I am running counter to nearly all other writers on the matter, both English and American; nevertheless I rest my case on experience. I have found bows so made to be steadier in the hand and freer from jar, and to suffer nothing in cast. If you own or have access to a copy of Ford on archery, open it at the frontispiece, which is an engraving made, as Major Fisher says in his charming little sketch of Mr. Ford, from a photograph. In speaking of Mr. Ford's having broken a bow, Major Fisher says: "It was the very bow itself which remains in his hand and bends to this day in the accompanying illustration (a reproduction of the frontispiece just mentioned). I can remember that bow well, and a fine self-yew it was, of Buchanan's make, and of fifty-four pounds." Now with a

pair of dividers measure from the nocks of the two horns of that bow to the nocking point of the arrow on the string. You will find the distance from the upper horn to be the same as that from the lower horn. The arrow crosses the bow at the centre and not "an inch or an inch and a quarter above it." Since the camera had not then learned to lie as skillfully as it can now, I think I am warranted in believing that Mr. Ford's bow was made as I suggest that we make ours.

We lay out the back of the bow by drawing on each limb two lines that begin at the edge about a foot above and a foot below the handle, and curve in, very gently at first but more rapidly in the last eight inches, until they reach the ends of the limbs at points five-sixteenths of an inch from each side of the line down the centre. That leaves the ends of the bow five-eighths of an inch wide. We now plane off all the wood outside those lines.

To determine the shape of the bow as seen from the side, we begin at each end of the splice and on each side of both limbs draw a curved line that four inches from the end of the splice will be one-eighth of an inch in from the edge of the belly and at eight inches a trifle less than one-fourth of an inch in. From there on to the ends it should be as nearly straight as the shape of the back will permit, but all the time approaching the back at such an angle as will leave the bow five-eighths of an inch deep at the ends. The next thing is to remove the wood outside those lines, round the belly roughly with a draw-knife and a spoke-shave, and take off the sharp edges of the back with a small block plane.

In rounding up the bow, even in the rough, great care is necessary not to let the tool run in and start slivers. Where the grain shows a tendency to tear, the spoke-shave is safer than the draw-knife, and the rasp or file safer than either. It is better to proceed a little more slowly than to spoil a good stave.

From now on, making the bow is chiefly the task of re-

moving wood from the right places, and principles are worth more than minute directions. The thing to keep in mind is that every inch of your bow from the horns to a virtually unbendable middle of eight or nine inches should *work*, and that every inch should do its just share of work—no more and no less. To produce that result each limb should taper toward the horn by exactly the right amount of reduction. A calliper rule moved along the limbs should find no spot that is not a trifle less deep than every other spot nearer the handle. If the limbs are irregular in shape or if the sap dips deeper into the heart at some places than in others, it is difficult for the eye to determine whether the taper is even or not; but holding the bow against a window in the daytime or against a light curtain at night will show it in silhouette, with the sap and the heart no longer distinguishable. Irregularities in the taper can then easily be detected by the eye.

A bow for hunting should have a little different lateral shape from one intended only for fine target shooting. In target shooting a very desirable quality is evenness of pull from beginning to end. There should be no "hard place" in the last two or three inches. Otherwise it is difficult to make the draw of exactly the same length every time. That evenness is best attained by making the reduction from the unbendable portion a little quicker, or in other words shortening the unbendable portion a little. In hunting, on the other hand, the draw is usually quicker—more of a snatch—and an increasingly stiff resistance at the end makes for steadiness. It is just the difference between a set trigger on a rifle for fine target shooting and the four- or five-pound pull that most men prefer in the field.

The proper shape for the cross-section of a bow is the subject of a wide difference of opinion. A back rounding to the curve of that part of the tree from which it was taken, and having rather sharp corners, is, I have no doubt, the most logical shape, but to me it always looks awkward and amateur-

ish, partly, perhaps, because my taste was formed by the best bows of Aldred and Buchanan in the early '80's. My preference, therefore, is for a flat back melting almost imperceptibly into the curve of well-rounded edges. As to the shape of the rest of the bow, I have no doubts whatever. The depth should never anywhere be greater than the width, but depth and width should be alike in the handle; and throughout all the rest of the bow the depth should be less than the width and in an evenly increasing ratio as it approaches the horns. The back should keep its width well out toward the horns and then taper somewhat quickly in the last ten inches. The curve of the belly should be at the handle what Dr. Pope well calls a round Roman arch—a semicircle the ends of which are protracted into lines that approach the back at right angles. From there on it should gradually change to a parabola that becomes more and more flattened and at the same time somewhat more sharpened as it approaches the horns. Of one other thing I am sure: that the high, pointed or "stacked" belly, the Gothic arch, is the worst possible form, especially in a target bow. It undoubtedly adds to the cast, but it is a constant invitation to chrysalis and it gives the bow a nervous, hair-trigger quality that is the very opposite of steadiness.

How many, many times, when I have been drinking black coffee from an old-fashioned cup of the right shape, have I mentally plotted the various cross-sections of the perfect bow by tilting the cup with only a tablespoonful or two of coffee in it! As the quantity of coffee and the angle of the cup change, the shape of the pattern changes, too. That part of the coffee that laps the bottom of the cup forms the back of the bow, and the part that rests on the side of the cup makes the apex of the belly. So, by changing the angle at which you hold the cup, you can round the edges of the back much or little, and sharpen or dull the apex at will. It is the easiest and also the pleasantest way I have ever found to fix in the mind those subtle curves that at once delight the eye and make



ARTHUR YOUNG





a bow lively and durable; for if you happen to drink too much of the coffee to produce just the figure you want, the matter is easily remedied by pouring a little more into the cup. It is the only problem in conic sections that I ever liked.

From now on, shaping the bow is a matter of careful work and constant attention to what you are doing, lest you take off too much wood somewhere. The chief things to bear in mind are that you must make the change in the shape of the cross-section gradual from handle to horns and must reduce the depth from back to belly evenly all the way. You must also, of course, follow the grain; but if you followed it on the back, observing the other two requisites just mentioned will take care of that. The only exception is that where there is a hump on the back and a corresponding hollow in the belly you must leave a little more wood in the hollow; otherwise the bow will bend, or seem to bend, too much there. Unless your wood is unusually straight-grained, the half-round rasp, the half-round file (each about twelve inches long) and the scraper, are the best tools for that part of the work.

When you have reduced the bow enough to bend it somewhat, cut notches at the ends with a rat-tail file, deep enough to hold a string, and brace it about six inches. The string should be at least twice as large as you will ever use on the finished bow; for the bow itself at this stage should be much heavier than you intend it to be finally. See now if the bow bends evenly from the handle, and if it does not, mark before you unstring it the places that must be still further reduced; then unstring it and work those places down.

For that and for all the rest of the work from now on a sharp scraper is incomparably your best tool. A flint or obsidian scraper was the mainstay of the primitive bow-maker, and a steel one is the modern bowyer's most useful helper. If it is properly sharpened it will remove a very thin shaving at every stroke, and it does not tear or dig, but follows the grain automatically. It should leave the bow so free from

ridges as to impose little work on the sandpaper; but to attain that evenness of contour that so quickly distinguishes a really fine piece of workmanship from one that is poor or commonplace, you must attend carefully to certain things. See that you are keeping the apex of the slowly changing parabola of the belly perpendicular to the centre of the back. Otherwise your bow will be lopsided—a hideous fault. See also that the rounded edges of the back melt into the curve of the belly evenly, and not more abruptly in one place than in another. You can get that result only by changing frequently the light in which you are working, and by observing the bow from every possible angle. If you have been scraping a limb with the light coming from over your right shoulder, look at the work, when you have finished, in a light from over your left shoulder and see if it still seems true. Hold the bow horizontal with the back down and the edge toward you. Roll it slowly from you, and see whether the evenness of the taper remains true, or is broken by depressions. Keep at it until you have reduced the bow to within three or four pounds of the weight you want and until it bends evenly, and shows no irregularity from any angle or any point of view.

It is easy to speak thus casually of getting the bow to bend evenly, but in practice it means many trials in the tiller, a piece of board or plank an inch or an inch and a quarter thick, a yard long, and two and a half inches wide. In the middle of one end is a rounded hollow to receive the belly of the bow at the place where the two limbs balance, and on the upper edge, at intervals from twelve to twenty-seven inches from the bow end, a series of notches to receive the string. As you work, try the bow from time to time in the tiller. Set the string first in the notch that marks twelve inches, and note how the bow bends. Try it again at eighteen inches and so on, until the bow takes perfect form at twenty-seven inches.

At all the lower notches it should bend a little more in the upper limb, since that is longer when measured from the ends

of the handle; but at the last notch the bend should be absolutely even and symmetrical—not an arc from end to end, but two equal arcs springing from an unbending middle.

A yew bow can easily be made too “ whip-ended,” that is, made to bend too much at the outer ends of the limbs. Such bows, though quick in cast, are usually somewhat “ jumpy ” in the hand—I don’t mean that they jar—and almost always less durable than bows that are somewhat sturdier in the last quarter of the limbs. They are really too quick for the steadiest shooting—too quick for mind and nerves and muscles to synchronize with the instantaneous response to the loose.

But now let us make the horns, for which the best material in the world is the ends of the horns of domestic cattle. The East Indian water-buffalo, or carabao, provides a harder and blacker material, but it is somewhat heavier and not so tough; it splits more easily. As for tips of pewter, aluminum, bakelite, hard rubber, wood pulp fibre and other materials that have been used, all are abominations. The bow is a primitive weapon and for those persons who have any historic sentiment or artistic imagination, its charm lies much in the fact that it can be so made as to have nothing about it that primitive man could not have supplied from his surroundings. Horn is the one material that is both light enough and strong enough and that is “ in character.” Metal tips on a bow are as offensive a solecism as a silk hat would be with a pair of mukluks.

To bore the horns you must have a tapered drill or reamer an eighth or three-sixteenths of an inch in diameter at the smaller end, and seven-sixteenths or a half-inch in diameter an inch and an eighth from the end. You cannot find it in the shops, but any machinist can make it for you.

Drill the hole before you do anything else to the piece of horn, otherwise you may split it. Having drilled and reamed the hole, fit a piece of wood to it about six inches long, shaped like the end of the bow; and if you are going to form the horn on an emery wheel—the easiest way—glue it to the piece of

wood; but if you must shape the horn with rasps and files, leave it free, so that you can set the stick in a vise and turn the horn upon it as you file. The great advantage of doing the work in this way is that since the stick is negligible, you can file or grind the horn to a feather edge where it is to join the bow, and so save much work later.

In shaping the horns, remember that so far as utility is concerned, they are only ferrules, but as to finish, they are ornaments. If graceful they add much to the beauty of the bow, but if clumsy they make it bourgeois. The tendency is to make them too heavy, though a little thought by anyone who has ever thrown a green apple from the end of a pliant stick will recall how weight at the end of the stick retards speed. They should be thickest at the lower edge of the nock, and should be nearly round there, but beyond there somewhat flattened at the sides. Cut the notch for the string with a rat-tail file, and round the edges so that they will not fray the loop. Making the upper horn a little longer than the lower, and of a somewhat different shape, furnishes a convenient way of noting whether or not the bow is right side up, though to an experienced archer the balance tells the story.

In fitting the horns take care that the wood of the bow goes "home" to the very bottom of the hole, and that it fits everywhere. Before you glue the horns on, score with the edge of a file that part of the bow that is to receive them; it makes little channels for the glue.

The bow being now in condition to shoot, take it into the field and try it out thoroughly before you finish it. Let someone else shoot it who draws the same length of arrow that you draw, and notice how the bow bends. Mark the places where more wood must be removed, if there are any, and scrape those places down. If by chance it proves to be a little lighter than you had intended, soak the horns off and shorten it an inch, or even two inches—it will still be safe for a twenty-eight-inch arrow—then refit the horns and try it again. It is only

in that way that you will ever get a completely satisfactory weapon. Good old Roger Ascham knew what he was about, and there is no sounder piece of advice in his whole book than that in which he tells his friend to choose a bow that seems to have good wood in it, but is longer and heavier than need be; then, when he has taken it into the field and shot it and tested it out with heavy shafts, to take it to a good bowyer and have him work it over.

Dr. Pope, in *Hunting with the Bow and Arrow*, gives the same advice, and with him, too, it rests on experience. I repeat it, with the same right. When the archer is his own bowyer it is easy and pleasant advice to follow.

Having satisfied yourself that your bow is as nearly perfect as you can make it—that it bends evenly and is free from kick and jar and is of the weight that you want, or a pound or two heavier—proceed to finish it. Go over it twice with sandpaper, first with No.  $\frac{1}{2}$  then with No. 0 or No. 00, but bear on rather lightly with the No.  $\frac{1}{2}$ . You will thus reduce the high places more rapidly and evenly than by bearing on too hard. After the second course, wet the bow lightly all over by dabbing it with a cloth wrung out of water, and let it stand an hour or so. The dampness will raise the grain, and you will then have to sandpaper it all over again. Never mind. If your patience holds out, wet it once more and when it is dry give it still a third sandpapering and follow that with the finest of steel wool. You will now have a surface almost as smooth as glass, and one that will stay smooth; for your alternate wetting and sandpapering the wood has raised and laid the grain for good and all; it will not rise again, even if the bow gets wet.

For the hand grip you can use fish line, leather, worsted braid or cane such as they use for chair seats. If you choose leather, cut it to fit, with enough allowance for a lap on the back, shave the edges that are to lap till you have brought them to a feather edge, dampen the leather, and glue it on or



cement it with leather cement. If you use cane, soak it a few minutes in warm water and put it on while it is still damp, after having first coated the grip with glue. The twine and the braid should be put on dry, but wound in glue, and the twine should be shellacked and afterward varnished. At each end of the wrapping glue a leather band from five-sixteenths to three-eighths of an inch wide, for a finish. The upper band will serve also as an arrow plate, or surface on which the arrow will run when it is in the bow. It is better than a piece of pearl or ivory let into the wood, for it requires nothing to be cut away and can easily be replaced when it becomes worn.

How you shall finish the surface of the bow—with varnish or a French polish—is a matter of personal taste. My own preference is for the French polish. It takes time and patience, but it produces a beautifully smooth surface that is not too glossy, that turns water as well as varnish turns it, and that neither cracks nor shows scratches easily. The best way to apply it is to pour some raw linseed oil into one saucer and some shellac into another; dip a heavy woolen cloth, folded once or twice, into the oil first and then into the shellac, and rub the bow lengthwise quickly and hard, until the cloth begins to get "tacky," let the coat dry a few minutes and then apply another. It will take ten or a dozen applications to produce a perfect and durable finish, but it will be worth the labor. After that you will never have to do anything to the bow except to wipe it now and then with an oily rag.

And now, though we have made a bow and have tried it and found it good, there has been as yet no word of the real secret of it. I have kept that till the last. It is this: Get rid of the thought of time as a necessary element in the job; keep before your eyes a vision of what you wish to produce, and put out of mind the thought that you must produce it within a definite period of time.

A missionary once saw a native squatted on the ground, slowly rubbing a crowbar back and forth on a rock.



"What are you making?" asked the missionary. "A needle," said the native.

That savage missed his calling. He should have been a bowyer.

#### MAKING BOWS OF OTHER WOODS

It does not seem to me to be necessary to write another chapter on the making of bows from woods other than yew because practically everything that Mr. Frentz has said in his masterly article is equally applicable to almost any other material. This is particularly the case if the wood to be used have a distinctly marked sap and heart. For example if one were to make a bow of black locust or mulberry, he could follow every word without change or modification.

In the case of lemonwood the chief directions would remain the same but a number of possible omissions would make the labor much less. For example it is as easy to get a six foot stave with straight grain as a short one with crooked, so that all questions of raising imperfections, making the graft, following the grain, and the like become non-existent. Neither is there any sap wood to bother about. Thus all one need do is to mark out the dimensions as they have been given and work away the wood. It must be remembered, however, that lemonwood is stiffer than yew and that the bow may therefore be made a little thinner and may taper more continuously from the middle to the ends.

I should like to repeat that the horns are only ornaments, and, as they are hard to make, I think they may advantageously be omitted in one's first attempt at bowery or in making bows for boy scouts.

Mr. Frentz has not touched on the subject of backed-bows, as I suppose he thought they were beyond the ability of the average amateur. It is not necessarily so. If the wood be of a sort that should have a back of sap wood and have not, such as the heart of yew or mulberry, one must be glued to it

or it will break. So far as I know, there are only five materials used for backing: parchment, rawhide, hard fibre, wood and baleen or whalebone. Of course I am not considering the complicated backings of composite bows.

Parchment and rawhide add nothing to the strength of a bow but they do exercise a decided influence on the prevention of fracture. For a wood like cedar, which is so easily obtained and yet so soft, it is an easy and effective way of producing a fairly good weapon. The process of application is simplicity itself. The bowyer wets a strip of the hide, sticks it on the bowstave with good glue, and wraps it about with a bandage to hold it tight while drying. Some even do not take this precaution. I might add that good rawhide may be obtained from manufacturers of artificial limbs.

Some of the great flight shooters have a better opinion of rawhide than I have, and they are in a position to know. They say that if it be held tightly stretched between two points while the stave is bound to it and drying of both rawhide and glue occurs, it will, by its tension, improve the bow's cast.

Sheet fibre was first used for backing in the early twenties and I think that the honor of priority in its use belongs to Rounsevelle, an opinion shared by the patent office. It has good qualities of protection against fracture and has the further merit of being easy to apply. One may cut it from the same material that he uses for making bracers and, inasmuch as it is really a sort of thick paper, it may be softened in warm water and laid snugly on a bow of any shape. Experiments by Dr. Hickman which were published in the *Journal of the Franklin Institute* of Philadelphia for October, 1929, showed that the bows he used in making his tests were slightly increased in power, or cast, by the addition of fibre backs. The augmentation was due to the thickening of the bow and not to any inherent virtue in fibre but, for certain, the backing did not make the bows more sluggish. Fibre is

useful on soft woods but there is no good reason for applying it to lemon or lance.

Most backs are made of wood, which not only protects the fragile belly from breaking but adds strength as well. Inasmuch as the one requisite of a back is great tensile strength I believe that the best material is hickory. Many writers, especially Ford, claim that yew is best, especially when backing a yew belly. Perhaps this is so as regards this particular species, as it thereby forms what is practically a self yew bow, but I do not think that with most other woods the yew has any particular advantage. The white wood of yew does not seem to me to give any more cast than hickory when used only as a back.

I once corresponded with a man who had poachingly shot a deer, when he was a lad in Austria, with a bow made of the heavy whalebone ribs of an old fashioned umbrella. Recently, Dr. Sterling, of the anthropological department of the Smithsonian Institution, told me that in ancient times, but not now, the Esquimaux used that springy material in bowery.

In America it was employed for a backing material early in 1929 by Frederic L. English and Norman C. Somers of Carney's Point, New Jersey. Baleen, from Latin—*balæna*, a whale, is a horn-like substance which hangs in great dependent plates, close together, from the top of a whale's mouth. The plates are from two to twelve feet long and end in fringes of stiff hairs which are sometimes used for making brushes, the whole mass forming a vast sieve for straining plankton from the sea-water. Structurally, baleen is formed by the agglutination of these hairs, which run from root to tip, joined most of the way but free near the ends. It can therefore be split or torn into quite thin sheets, being perhaps a quarter of an inch thick originally. Before products like celluloid and other such substances were available, it was as valuable a part of the whale as the blubber, or even more so, but now the whalers do not even bother to cut it out and

bring it home. English and Somers had to get a Californian whaling company to save some especially for them. It makes a wonderful back of any desired length. Some lemonwood bows that I saw and drew, which had been made very much whip-ended for experimental purposes, bent to an incredible extent without breaking. It certainly should be widely used in the future.

Professional bowyers seem to make light of the difficulty of making a perfect fit between the two strips of wood, which I attribute to their great skill in the use of a plane. To me it is a very hard job. I believe that the best practical way, if you can bury your pride, is to take the pieces to a good cabinet-maker, or to a planing mill, and have the surfaces smoothed for you.

The only directions for making the joint yourself, that I can give you, are to have the pieces well fastened to a flat surface, use a long joiners' plane and carry through your stroke from end to end. It takes a wonderfully steady hand.

To glue the back and belly together the English use a backing-frame. This consists of a strong wooden bar about two inches wide and three or four inches deep which is often faced with iron. Fastened to it at intervals of about four inches are iron half-hoops, like little croquet wickets, high enough to take the stave and allow room for wedges. To use the frame the back and belly are heated, if cabinetmakers' glue be used, or put in cold for casein glue, and the two are then firmly pressed together by driving double wedges under each hoop, or loop. A double wedge is made of two single wedges which point in opposite directions and thus present a flat surface to the work.

It seems to me much simpler to use screw clamps, which can even be bought in our "5 & 10" stores. They can be applied with no trouble at all and do not require that the belly be perfectly flat, as is necessary in a frame.

The merits of the various kinds of woods for bows are discussed in the chapter on tackle.

## HOW TO MAKE A GLUED BOWSTRING

*By A. Shepherdson*

As a working basis, I would suggest for convenience, taking a board about ten feet long and eight or ten inches wide, and planed at least on the side to be used. This is to act as a table or bench by laying it across the backs of two chairs or on a table or bench. Standing at the side of this board, facing it, we start by calling the left end of the board the loop end, and the right end the tie end. With a pencil draw a line across the width of the board two inches from the end. Call this No. 1 line. Draw another line seven inches from the end of the board and mark a cross on it to act as the upper nock of the bow and the centre of the loop. Make another line one inch to the right of this cross line or eight inches from the left end of the board, and call it No. 3 line. If the bow to be fitted with a string is six feet long, measure six feet along the board to the right from the cross and make another line across the board. This is to act as the lower nock of the bow. If the bow should be five feet six inches, make the mark five feet six inches instead of six feet. If the bow is some other length treat the marking in the same way. Go back and measure eleven inches to the right from the left end of the board and draw a line, calling it No. 4 line. One inch to the right of this No. 4 line make a No. 5 line. Take a wire brad or nail without much head and drive straight into the board at line No. 1, leaving about two inches projecting. Measure down the board to the right nine feet, for a six foot string, and drive another nail (No. 2) the same as the first. For a five foot six inch string make it six inches shorter. Then we are ready to make the string.

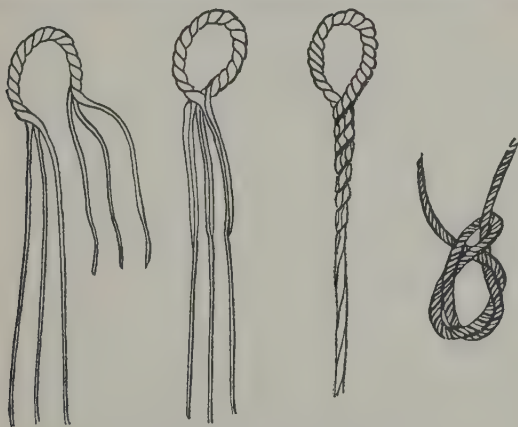
Use Barbour's No. 12 Irish Flax. Take the end from the inside of the ball and tie it to nail No. 1. Pass the thread to and around nail No. 2 and back, and around nail No. 1, then

to nail No. 2, and so on until you have ten threads. Loop the last thread around nail No. 1 and cut it loose from the ball. Pass the ten threads between the fingers and thumb from one end to the other, which will make them cling together more or less until the string is made. Lift the threads from the nails and lay to one side while you repeat this process twice more. This gives you three strands of ten threads each. Place all three strands on the board, but not close together so they will become tangled. Put the left ends all at line No. 1 and with a sharp knife cut them all at line No. 5. This will give you three strands ten inches long to use for strengtheners in the loop of the string. Cut off twelve inches from the other end of the three main strands to use as strengtheners in the tie end of the string. Take all of these short strands, one at a time, and wrap in the centre once around the forefinger of the left hand so that the end can be laid out straight for about three inches on the board. Hold them tightly with the thumb to prevent slipping. Begin about two inches from the end of the strand and scrape with a knife. In this way you will fray out or scrape away some of the threads so that the strand will become smaller at the ends but the original thickness will be left in the centres. By reversing the strand on the finger and tapering the other end in the same way you will have all these shorter strands the original size in the centres but tapering for about two inches at each end. Taper the left ends of the three main strands, and the string is ready to put together.

Take one of the three main strands and lay the point of the tapered end up flush to the left end of the board and straight away to the right across the numbered lines. Take one of the ten-inch strengtheners and lay with it having the centre of it come on the cross line, one end at No. 1 line and the other end at No. 5 line. Take it firmly in the left hand at the cross line, and, with a piece of pure beeswax, wax the two strands together permanently by drawing the strands through the wax so that the whole of the short strand becomes a part of the



main strand. Repeat the process with the other two main strands. When this is done lay all three main strands with their pointed ends flush with the left end of the board and together as one piece. Grasp the whole at No. 3 mark between the forefinger and thumb of the left hand. With the points or short ends up, bearing slightly to the right as you naturally will, bring both hands in front of you to work. Begin by holding the left hand still and with the right hand take one of the short pointed ends and twist for two inches to the right, and pull toward you and down sharply. Then take the second strand and do likewise, and the third the same. Repeat alternately for about two inches, in which process the left hand will have to follow up to where the strands are being twisted. You will then notice that the three strands are taking the form



Three Steps in Making the Eye.  
A Timber Hitch for the Noose.

of a perfectly twisted miniature rope. When two inches have been twisted, bend the twisted portion in the centre making the loop. Spread slightly the three main strands below the loop, separate and lay one of the short ends on one of the main strands and squeeze together as one strand. Do likewise

with the other two, bringing the twisted ends of the twisted loop snugly together. Grasp the loop at the junction between fingers and thumb of the left hand and twist the main strands to the right one at a time, in rotation, and bring them down and toward you, in the same manner as twisting the loop, down to the ends of the strengtheners. This completes the loop.

Now comes the most important part of making the string. Care must be taken to have twists and snarls out and to have each individual thread lying straight, or all the labor will be in vain. To avoid the error place a scratch-awl in the loop, sticking the point into the board at No. 4 mark so it will not pull out under strain. Wrap a small cord around the string just where the twisting stops and tie it tightly with a single bow-knot that can be untied hastily. Take one of the main strands between the fingers and thumb of each hand, beginning at the knotted cord, and pulling down the board from the loop to the end of the strand in a sliding and combing motion, keeping the strand as flat as possible (not round) until by feeling you know that all the strands are lying straight. Then, keeping the tension on the whole strand, lay on the twelve-inch strengthener so it centres on the six foot mark, or the lower nock, and wax in its whole length to the main strand. Do the same with the other two. Then, with all three strands, begin back at the knotted cord, placing the strands between the fingers separately: one strand between the first and second fingers, another strand between the second and third fingers and another between the third and fourth fingers. Use the same sliding motion with one hand and then the other, from the loop end to the lower strengtheners until you are quite sure that they are all flat and free from twist. Then with equal tension on all three strands, grasp them where the strengtheners begin with the left hand firmly. Release the tension and twist the strengthened ends into a cord as before.

On finishing the end, take one strand around the other two in the form of a single knot, which keeps it from ravelling.

Hang the loop of the string from a hook in the ceiling. At the lower end tie with a single bow-knot to a hod of coal or something that will weigh thirty or forty pounds, with slack enough to permit slipping loop off the hook. The weight at the bottom should be placed on a table or chair while doing the coating and lifted off and allowed to hang full weight on the string while twisting the centre.

Make a solution of good glue (Cooper's A Extra I find the best) the consistency of thin cream when the glue is hot. Mix three parts of this to one part glycerine in an open vessel. Take the loop of the string from the hook, straighten string out and twist three or four times around to left to keep strands from separating, and coil it up in the hot glue pushing under until it is thoroughly soaked. Draw out through a cloth held in one hand, beginning at the loop. When all is clear of the glue dish, hang loop on hook and lift weight from table or chair, putting full weight on string. Start revolving weight to the right which will twist the centre in the same direction as the ends. While the string is twisting rub it with the bare hands to free it as much as possible from surplus glue, wiping it from time to time with the cloth. This process must be accomplished as quickly as possible to free it from too much glue before the glue sets. Do not twist it too much, but when enough, anchor the weight down to prevent untwisting, and remove tie string under loop. When dry put on the bow and rub with beeswax where the serving is to be. This will keep the serving from loosening. Whip in the usual way. This makes a small and keen shooting string. A thirty-strand string of this type will stand perfectly safe on a fifty-pound bow.

The glue mixture may be used over and over again, but if by use the solution becomes too stiff when dry add water and glycerine to bring it back to its original consistency.

## FURTHER COMMENT BY THE AUTHOR

It is undoubtedly best to take the time and trouble to make a string with glue in the way Mr. Shepherdson has described, as his home-made strings are the best I have ever seen and as the professionally made strings of Belgium are also laid in glue, or at least are smeared with it.

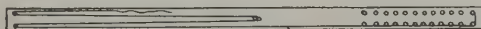
Yet one often needs to make a string in an emergency, such as might occur while hunting or even if one's supply of strings should run short during a tournament. It is not absolutely necessary to use glue; some very good stringers never use it. It is really quite enough in many cases to simply wax the threads well for their whole length and then work them into a cord as "Shep" has described.

Knight, with his vast experience among boy scouts, has pointed out that one need not have a board for marking off the strands. A simple way is to measure off six or seven feet, according to the length of the bow, either by using a tape or ruler, comparing it with your height or measuring from the tip of your nose to your full reach as a dry-goods salesman does. When the length of the first thread is found it is simply pulled back and forth in the hand, measuring off others beside it, till the whole ten are made. If a taper be desired it can be made by laying each thread a half-inch shorter at each end than the one before it. The reinforcing strands are made by cutting up an extra long strand into six lengths of a foot each.

McMeen invented a very ingenious board for measuring strings, a little thing which can be carried in an arrow box of large size.

It consists of a one-inch slat thirty-three inches long. At intervals of one inch twelve brass brads are driven in two parallel rows near the edges. At the other end of the board two brads are driven and nearly in the very centre of the slat is a third single brad. All of the brads protrude far enough to allow the thread to be held by them.

To make a strand, tie the thread to one head pin, pass it over the other head pin, then down to the foot pin on the same side, up and around the centre pin, back to the other foot pin, and up to the second pin or one next to where the start was made. This gives a thread of the maximum length, but one of the beauties of this board is that all the threads for the strand, properly tapered, can be wound at once and cut with a single swipe of the knife. So pass over the other second pin and, by the same route, go around to the third on the beginning side, and so on in descending lengths, or around receding pins, until as many threads be wound as are needful for the strength of the bow. The one cut, down the centre between the pins, frees them all. In fact, the three strands can be wound at one operation if bits of paper or any other flat objects be laid between the strands to keep them from getting mixed. For the short reinforcing threads, use the taper brads and the centre brad.



For ladies' strings set another centre brad three inches nearer the end.

While Barbour's No. 12 is an excellent thread, it is by no means the only one that may be used. A kind that I like very much is the Hand Sewing Linen No. 12 of the Miles Linen Company of Salem, Oregon, made of home grown flax. Another first class thread has been brought to the attention of archers by Crary Brownell, of Moodus, Ct., who ranked eighth in the tournament of 1931 and therefore ought to know what we need. Furthermore, he is in the net and cordage business. It is a 60-yarn 3-ply Irish linen, spun and twisted under water for use in gill nets and, though it is imported by the pound, Mr. Brownell has had small reels wound off for the convenience of archers.

On my scales the Miles thread breaks at about four and a

half pounds and the Irish  $\frac{6}{8}$  at about seven, yet the latter does not look any thicker to an untrained eye like mine.

It seems to me that the whipping of a bowstring deserves comment. I think the best material to use is a hard linen thread. If wound on by hand do it thus:

String the bow at the proper height as though you intended to shoot. Mark the proper nocking point on the string and begin to wrap an inch and a half above it. This may seem unnecessarily high but it is better to err on the safe side in case the string should let down, thus dropping the relative position of the serving. I usually lay the bow across my knees while serving but some prefer to rest the lower horn on the ground and lean the bow against a shoulder, somewhat like a man playing a cello or harp. The string may be served as a single thread or time may be saved by laying on from two to four strands at once. If more than two be used it is more apt to come undone or to slip on the string, leaving an open place where the arrow nocks.

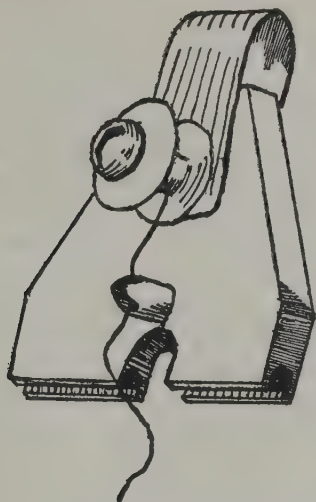
To fasten the upper end is very easy, as one merely wraps under a short end of the thread. To finish the lower end is not so simple. The best way is to throw a large loop over a finger and wrap the thread within this loop for six or eight turns, thus making it possible to encompass the string tightly by wrapping it about with the loose string which formed the large loop. When all is wrapped pull the thread taut, or, in other words, pull the slack of the loop through the last few turns which overlie it.



Personally I serve all of my strings with a small device consisting of a bobbin from a Singer sewing machine screwed loosely on a small flat piece of wood and kept at proper tension by a flat spring, as shown in the illustration. Winders may,



however, be made in many ingenious patterns, though all use the same general principle of a spring-controlled feed, and any of those sold by dealers is worth the purchase.



## XII

### HOW TO MAKE ARROWS

MANY archers, and I am sure a majority of the best ones, find pleasure in making part of their tackle or in some cases even all of it, sometimes to put to a practical test various theories of construction but more often for the joy that any craftsman feels in producing the thing he loves.

I will tell, as best I can, how to make arrows of the various kinds.

It is best to begin with the easiest sort and improve our models as we acquire skill. Let us then consider the kind that are made by the thousand and sold to toy stores, boys' and girls' camps, boy scouts and so on. They fill a very valuable place in archery; for example, I have fitted out my four children with quite fair arrows, some of which were used in national tournaments, at a cost of perhaps four cents a shaft.

First buy a sheaf of 100 hardwood dowels, five-sixteenths of an inch thick and usually made of birch or maple, the former being preferred. The last bundle I bought cost \$1.25. Then send to some manufacturer of rifles (I personally buy from the Remington Arms Company) for 100 cupro-nickel jackets for rifle bullets, size 30 calibre. They are very cheap. The only other necessities are feathers, glue and paint.

With all of our materials thus in hand we start to work, taking for our first trial the shorter arrow of 25 inches which is used by women and boys.

Lay a dozen dowels side by side on a table with one end against a board or any straight edge. Mark off 25 inches on the two outside ones, lay a ruler across them all and with one sweep of the pencil mark every arrow. With any fine saw,

cabinetmakers' saw, hack-saw or whatever you have, cut each one off at the mark. If you use a vise at any time to hold an arrow fit it first with soft wooden jaws with round grooves cut in them so as not to pinch the shaft.

Next put on the point. Nothing could be simpler. Just take a knife or broad chisel, lay the shaft on the table, place the edge of the tool on it about three-fourths of an inch from the end and roll the shaft while making pressure, thus cutting a ring around it. Then, using care, trim down the diameter of the end portion either with a flat file or by reducing carefully with the same tool that made the ring till the bullet can be forced on with a driving fit. To force it home use a wooden club or mallet or else start it with the fingers and then shoot the arrow with a bow against the floor.

To make the nock saw a slot one-fourth inch deep in the other end with your fine saw and widen it with a key file to the size of a bowstring. At the same time shape the whole nock end of the arrow with the file to a pretty, rounded taper for about one-half inch.

At this stage of the operations the shaft looks quite like an arrow and I usually give it a good rub with sandpaper before proceeding to fletch it. Fletching, or feathering, requires knowledge, skillful dexterity and great care and as the subject is the same for the best arrows as for these cheap ones I will treat of it in detail.

First, a feather is of little use unless it be stiff and so the ones in common use are the pinion feathers of the turkey and peacock. In old English writings the feather of preference was from the gray goose, but that was because they did not have the turkey in those days. At the present time all the English arrows that I have ever seen are fletched with the feathers of the two birds I have mentioned, either in their natural colors, or white from albino varieties, or dyed. Lately I have obtained "Black Eagle" feathers from Duff, who gets them from a dealer in New York. Just what bird they really

come from we do not know, although they are much like those of a turkey buzzard, but they are possibly the best of all.

There are two principal ways of preparing a feather, either to strip the web, or vane, from the shaft, or rachis, with the unaided fingers or to remove it by mechanical means. Each method has its advantages but the preference of expert opinion leans rather toward the latter.

Drawing a feather, as the former operation is called, is very simply done. You hold a plume by its distal end between the left thumb and finger and with the right pinch a few barbs as near the tip as may be. Pulling them in a downward direction, rather close to the shaft and toward the quill, tear off a narrow strip of the horny wall in which the barbs are rooted. This stiff little ribbon comes off clean from the pith and needs only to have its edges sheared by sharp scissors to be ready for gluing to the stele. While this is the quickest and easiest way, it has the great disadvantage of sprangling the barbs. However, some excellent fletchers make light of this temporary disorder, claiming that it is perfectly righted by stroking the vane, as when a bird preens itself, and that it leaves no impairment of structure.

The method of the British fletchers I learned from watching Duff at work. As done quickly and neatly by his practiced hand it looks simpler than it really is, but one will not ruin many feathers before he can do a fair job. A *sine qua non* is a razor-sharp knife. Some use a safety razor blade, but it is not strong enough for my liking. I made a very satisfactory knife by grinding down an old key file. Whatever may be the kind you use it must be stropped after every few cuts.

The rough trimming of the whole feather is done with an ordinary pair of scissors. With a few rapid cuts trim off the big quill and a little of the vane at the proximal end and as much of the distal end as has too small a rib for use. Cut the narrow side away entirely and trim the wide side to five-eighths of an inch. Then lay the feather on its back, that is

with the convex side down, on a perfectly smooth, narrow board with the rib near the edge where the knife-blade can reach it easily.

Now, here come the two master cuts. The first is flat to the table. Holding the rib down with the thumb and finger of the left hand draw the razor-sharp blade through it with a slicing motion, thus cutting it perfectly flat on top and down level with the sort of groove that the vane grows from. If you cannot do it with one adroit movement trim it up afterward with little slices where required.

The second master cut is vertical to the table. Holding the rib as before cut it down with one skillful slit, beginning at the small end, so that the back, or unseen, edge of the cut is close to the vane and the upper edge, which the eye can direct, leaves a little of the rib, or quill, for the glue to hold to. The thin layer of cleanly cut pith is allowed to remain and should not be scraped out.

After these two cuts I usually straighten up my backbone and breathe a sigh of relief.

Grinding is just as good as cutting and is much easier, the feather being clamped between two strips of wood or metal and the rachis pressed against the broad side of a carborundum wheel. Long jaws rivetted or soldered to a paper clip give an excellent tool that can be made by anyone, though the tension of the spring may have to be reduced to avoid crushing.

Probably an arrow vane is the strongest and best whose quill has a little pith left in it and has not been bent by drawing. Advocates of drawn feathers, however, contend that it is better to have the glue in direct contact with the horny rachis than to have it separated by a film of pith.

The feather is long enough to make two or three arrow vanes and is quickly cut into the correct lengths by laying it on pencil marks ruled on the cutting board and severing it with knife or scissors.

A very important fact about feathers to be borne in mind is that the right and left wings of birds bear an opposite relation to each other as our two hands do. The feathers curve in different ways and it is therefore necessary to use them from the same wing, or at least from wings of the same side on different birds, on any particular arrow. As a further refinement of this idea I prefer to have all of a set of arrows feathered from the same side, either all right or all left, but some good archers do not think this is necessary.

Perhaps I should have said before this that, while it adds nothing to the durability of the arrow to dye the feathers it does add to its beauty and permits the archer to give play to his artistic tastes. I well remember what a charming picture one of the ladies made at a tournament with her arrows dyed and painted a delicate blue shade to match certain parts of her attire and it made me wonder why others, who know what colors suit them, do not order from the fletchers according to their preferences.

To dye feathers is interesting, but, to insure success, one must know exactly how to do it. I know of nothing better than the familiar Diamond Dyes which are sold in every drug store. The envelope contains full directions for preparing the dye bath, which to be effective must be at boiling temperature. The two essential things for the dyer of feathers to remember is that they must be wet in cold water before being immersed in the ebullient fluid and that they must not be kept in the dye long enough to be cooked.

The best way is to protect your hands from being stained by wearing rubber gloves, take a handful of feathers, swish them about in a dish-pan of cold water until they are thoroughly wet, then do the same in the boiling dye, then back again for a douche under the spigot or in the dish-pan of water to wash off the excess dye and they are ready for drying. During all of this operation the stems of the feathers are held in the hand.



No doubt other dyes which have been put on the market more recently may be just as good as the Diamond but I have had no personal experience with them.

Feathers have a natural curve and yet on the shaft they must be quite straight, although some fletchers give them a slight bend to make them act like a ship's propeller and make the arrow rotate in the air as a rifle bullet does. Whether or not this makes the arrow fly better is a mooted point. When Will Thompson shot in the tournament of 1913, with his bow arm much weakened from having been broken at the elbow, he used the lightest shafts I ever saw, with a very light bow, and arrows that fairly spun in the air because of their greatly spiralled feathering. The arrows with which I have made my best scores have had absolutely straight feathers with no spiralling at all. Yet even a perfectly straight feather will impart a slow turn to an arrow because it is smooth on top and rough on the bottom. This can be observed by standing under a high arrow and watching the white cock feather come around.

Feathers may be put on either by hand or with a clamp. There are few accessories of archery in which more ingenious variation of design has been shown than in these clamps for fletching. All of them have as their basic idea a pair of hinged jaws which are held against the arrow shaft by spring pressure, some applying one vane at a time while others, combining three sets of jaws, fledge the arrow in one operation. To put a vane on at a slight diagonal is possible with some clamps, if the rachis be adjusted to the curve of the stele, but a spiral in the feather itself, up to the present time, can be made only by hand. A clever man may originate a clamp of his own but they are now so cheap and plentiful on the market that I think it is better to purchase one at first, even though it be improved upon later.

Binding the vanes on by a spiral wrapping of thread, one of the most ancient of methods, is not very satisfactory, even though great care be taken in passing the ligature between

the barbs, but it can be used for making repairs if the skill for better work be lacking.

To feather many arrows with a clamp is, after all, rather a tedious process, involving frequent reheating of the glue, and the finished work is no better than that done by hand. The following manual method, which I think is unquestionably the best, is the old way of the English workshops and I have learned it from watching Duff.

Have a piece of heavy woolen stuff, such as a few thicknesses of an old blanket, perhaps one foot by two in size. Dip it in boiling water till it is well soaked, pick it out, wring it a little to get out the excess water and lay it on a table. To do this without scalding the hands use two short sticks, as dyers do. Quickly cover half of it with feathers, all cut and ready for the shaft, fold the other half over on them, place a flat board and heavy weight thereon and let them lie and steam. In a few minutes they will be so limp and flat that they can be easily handled and are ready to be glued on. McMeen has told me that he has had good results from simply wetting the feathers well in unheated water but I have never tried this even more simple way.

Gluing on the feathers is the rock on which most amateur fletchers founder but, as in most things, its apparent difficulties disappear with proper instruction. The first step is to prepare the glue. This may seem surprising to those whose household mendings have never carried them beyond the liquid glues of commerce, but I wish to emphasize strongly that the most satisfactory work for target arrows can be done only with hard cabinetmakers' glue slowly melted in a double boiler or in an electric glue pot.

There is nothing difficult about preparing hard glue, although many people approach the job with misgivings. Merely cover some glue with water in a glue pot or double boiler, or in any cup placed in hot water, and let it slowly soften, giving it an occasional stir and keeping the outer water just below

the boiling point. Some people steep the glue in cold water over night and it is a good thing to do. If ordinary glue be mixed with Russian isinglass it is much better but at present the unsettled state of commerce makes it almost impossible to procure the real stuff. Russian isinglass is made from the sounds, or air-bladders, of sturgeons. It looks like ordinary gelatin. It is used for clearing drinks, either soft or fermented, and for making cements.

Before attaching the feathers to the shaft the latter must be marked and sized. The marking is done just as it was in the beginning when the dowels were measured to twenty-five inches. Again lay them side by side and sweep a pencil across them one inch from the nock end to show where the feathers should be placed. Then size the shafts by wetting the thumb and finger with glue and rubbing the part to be feathered till it is covered with a thin film. It is best to do this several hours ahead or even the day before so that it will be quite dry.

Now comes the crucial operation, which astonished me by its ease and quickness when I first saw Duff do it. I had labored with clamps and windings of string to hold the vanes in place but here I saw that nothing of the sort was required. All that one need do is to rub a thin film of glue on the trimmed portion of quill with a toothpick, stick the vane on the shaft in its proper place, with little more fuss than putting a postage stamp on an envelope, and lay it aside to dry. In a few minutes run the finger-nail along the vane again to be sure that it is stuck fast.

The condition of the atmosphere has a great deal to do with the success of gluing because if the glue set before the feather dries all is well, but if the feather dry before the glue has hardened sufficiently to hold it where it should be it curls up into its natural curve and tears itself loose from the shaft. The fletcher must also see that his glue is neither too thick nor too thin as in the former case the quill does not lie close enough to the arrow shaft, because of the thick glue between and in

the latter the glue dries too slowly. It is astonishing how long the feather will retain its tendency to resume its natural shape. I doubt if it ever loses it as I have taken feathers off of arrows used by the United Bowmen of Philadelphia about the time of the Mexican War and they curl just as much as if they had been trimmed the day before.

Another good method of fletching is by the aid of very fine steel pins, ordinary brass pins being too coarse and dull. If the glue be of the type of Dupont's Household Cement, a most excellent adhesive which I think is a solution of celluloid in acetone, it is one of the best ways because, in that case, a feather must be put on dry and so is stiff and hard to handle. While the operation can be done free hand, it is easier to lay the arrow shaft in a fletching rest. This instrument, which will also serve in painting crests, is a narrow board about two feet long provided with a pair of notched posts, or similar supports, and a pinning block. The block, about four inches long, is as high as the middle of the stele when it lies in the rests and is close against the shaftmond. In operation, the vane is glued, laid on the block, held flat by a finger and thumb and affixed to the shaft by several pins stuck through the rachis. The wood should first be painted with Duco to insure a good hold.

Casein glue is also very good if used with a clamp. It is used wet and the feathers may therefore be soft but it is very slow in drying and unless the feather be in a clamp it is pretty sure to curl and loosen.

In drying the arrows after gluing, or painting, they may be laid on a table, with the ends protruding, but the best way is to set them in a crib. This is a stand about a foot and a half in height with a top full of holes to put the arrows through, thus standing them up in ranks. This top may be made of a board, drilled with a hundred holes or so, but the easiest way to make a crib is to nail a piece of one-half inch wire netting over the open side of a box. This, by the way, is a good

thing for schools and such places to have in which to keep the arrows which are set apart for general use.

I do not make three longitudinal pencil marks to show where to put the vanes. If one set the cock-feather at right angles to the nock, so that it will stand directly away from the bow when the arrow is shot, he can easily judge by his eye when putting on the two shaft-feathers at 120 degrees apart, or one-third of the way around.

The shape in which the feathers shall be trimmed is largely a matter of personal preference. Up until the time of men still living the common shape was the triangular, simply made with a single cut of the knife or scissors. That style is still used by a few good fletchers but the usual shape of to-day is the balloon feather, whose outline more or less closely approximates a parabola. At the last tournament some feathers cut by Frentz looked good to me. They combined the sharp rear end of the triangular with the curved upper edge of the balloon.

To cut the feather in the triangular and Frentz patterns the feather knife and a templet are all that are necessary. By a templet I mean a piece of celluloid, tin, stiff paper or the like, cut out to shape and laid on the feather to guide the knife.

This method may also be used for the balloon feathers but the simplest way in the end is to make a stamp of the correct shape. One may be made by a tool maker, forged from the solid bar, and will last and give service forever but a cheap and good way is to make one yourself out of a steel scraper blade. The end of the blade can be bent correctly by hammering it on the edge of an anvil or vise. Of course, as in all tools used for cutting feathers, the edge must be ground and stropped very keen so as to cut clean by hand pressure only without the use of a hammer.

Recently, Harris McKinney, of the Tamanend Archers, hit upon the idea of shaping the feather by clamping it between two metal plates and singeing off the surplus edge, his friend, John B. Fontaine, of the same society, constructing a con-



venient tool for the purpose. There is merely the rapid passing of a match, candle or cautery and a perfect job is done.

Regarding the length of the vanes there is now a practical unanimity of opinion. Two or two and one-fourth inches is proper for the ladies' twenty-five inch arrow and two and five-eighths or two and one-half inches for the men's twenty-eight inch. I have some old Ainge & Aldred arrows which once belonged to Mathias Baldwin, that so far as I can see



Singeing Jig.

are exactly like the ones used by Ford. Their feathers are just five inches long and of course cut triangular. A few years ago McMeen and I decided to try out an arrow with several features that might turn out to be improvements and one of them was the use of the old five inch vane, although it was cut five-eighths inch wide instead of three-eighths as in the old model. He made a dozen of these and I tried them very carefully but my conclusion was that on the whole the short feathers were better. It may be that at the short distances of the American round the big feathers gave a steady flight, although I never felt wholly certain about it, but I am sure that for the York round in a high wind they had more drift, as would naturally be expected. Furthermore it is not likely that all the archers of the United States and England should have changed to the short feather unless it were better. I have some Belgian arrows made by Remi Gyselinck, of Detroit, which have immense vanes, five inches long by seven-eighths wide, but they are not satisfactory for our style of shooting. In fact I am confident that the only effect the big



feather has is to offer more resistance to the air and retard the flight of the arrow. On the other hand the feathers on the special arrows made by Whitman for Phil Bryant, with which he made the American record of 618 in 1912, had triangular feathers about three inches in length, if I remember correctly.

With the completion of the feathering the arrow is finished so far as its shooting qualities are concerned but it is still unsightly and will be greatly improved by being painted. While an infinite number of designs may be elaborated they follow a more or less conventional plan, for, although the decoration is still called the "crest," suggesting that heraldic devices may have been used in former times, it is now always in the form of rings of varying width.

The spaces between the feathers should be painted first with a solid color, touching the feather itself and serving the very useful purpose of protecting the glue from dampness. It must not be forgotten, however, in this connection, that if the arrow be subjected to continued wetting, as by lying out all night in the dewy grass, the feather itself is permeable to water and may become so soaked that the glue will be softened and the feathers drop off even if the paint be good.

Usually only a narrow one-eighth or one-fourth inch ring is painted between the feathers and the nock, as more than that would soon be rubbed off by the archer's fingers, but two or three rings varying in width from one-fourth to one inch are used below them.

To do the best job it is not necessary to chuck the arrow in a lathe, nor can it readily be accomplished entirely by free hand. The way of the professional fletchers is to lay the shaft in the kind of rest mentioned above and rotate it with the left hand while holding the paint brush with the right.

The cheap arrows which I have been describing are painted quickly and roughly but, as the method is the same for arrows of the highest grade, I will suggest a few refinements of tech-

nique. Do not use an oil paint, but have the colors ground in Japan and, if necessary, thin them with turpentine. Better apply two coats, if necessary, than have the paint hard to manage. Let the rings of color be close together, without any of the wood showing between them, and divide them with very fine black lines. These delicate lines add greatly to the finished appearance and must be made with great care. Some fletchers use a very fine brush and paint that is thin enough to run easily, others press a large brush to a chisel edge and use a thicker paint. Personally, I can do the best work with a draughting pen and Duco. In fact, Duco is an excellent arrow paint for general use because it is durable, dries almost instantly and does not need to be protected with varnish. While black is a general favorite for lines, it can often be replaced to advantage with any other tint that may complete a desired color scheme. Those who are skilled in gilding can get very rich effects by laying on gold leaf, as is often done in England.

When the paint is dry the whole shaft should be finished by varnishing or by rubbing with French polish, that is, dipping the rag first in white shellac and then in linseed oil.

To keep a good surface on both arrow and bow, when in use, nothing is better than the waxes and similar finishes that are made for automobiles.

I think this ends the description of the simple dowel arrow. The next step upward is to the self-arrow, which is made of a lighter wood and one which for target use, though possibly not for hunting, is usually considered superior.

Such wood is very hard to find. I favor spruce and Norway pine but Port Orford cedar, Douglas fir and occasional specimens of yellow pine may make splendid arrows depending on the grain and stiffness, or spine, of the piece of wood in question. This word *spine* should be graven on every archer's mind. It means the ability of the shaft to resist too much buckling, or bending, when shot from a heavy bow, coupled with a quick return to straightness. The handsomest arrows

in the world are useless without it as I and nearly every other archer have found to our cost, financial and otherwise. The only sure way to test the spine of wood is to cut a sliver and bend it, learning from experience when it is extra stiff. In general those specimens of wood are best which have the closest grain, indicating that the tree has grown in unfavorable conditions which have made a very thin layer of wood each year, thus developing a microscopical structure of much cellulose and little plasma, or cell filling.

However, this closeness of grain is by no means an infallible rule for the determination of spine. I shall always remember how astonished I was to find that the stiffest pieces of Port Orford cedar and some other coniferous woods are often those with the widest grain. Some believe that much depends on the thickness of the bone, or resinous layer, which is also known as "summer wood."

There are several mechanical devices which help one to determine the degree of spine in an arrow shaft, though none of them give results that can be accepted without the test of shooting the finished arrow in a bow. Stiffness and resiliency are the chief factors of spine and both can be found with apparatus that anyone can make. Investigation of stiffness is through two avenues of approach, either to find the weight that will cause a constant bending or to measure the bend produced by a constant weight. In the former method you may, for example, make a stand like the one used for fletching and painting, or the same stand may be used for all three purposes. If the posts be one inch high and twenty inches apart, a pressure of from four to six pounds will be required to press the centre of an arrow to the floor of the machine. One may actually hang weights on the arrow but a quicker way, invented by Arthur Knight, is to place the stand on the platform of an upright spring scale and note the reading as the necessary pressure is made with a thumb.

Personally I use a simple device made by driving two nails

in the wall twenty inches apart, marking linear measurements on the wall midway between them and using a spring scale of the hooked type to pull down the arrow. The results, like everything in archery, are surprising. My wife's best twenty-five inch Aldred arrows, which belonged in L. W. Maxson's family thirty or more years ago, bend an inch under only one pound. Some similar arrows that do not shoot so well take two pounds. An excellent set of footed arrows weighing somewhat over four hundred grains are close to six pounds while my 326 grain arrows, which shoot just as well, bend with four pounds. Some inferior steel arrows take  $9\frac{3}{4}$  pounds, some thinner ones need eight, while my best steel shafts require only five. Fractional variations are not given here. Some hunting arrows that were too stiff for target use were ten, a Korean bamboo that flew very well was ten and some Chinese war arrows were only six, which was not enough for their clothyard length of thirty-seven inches. It thus clearly appears that while the thickness, and hence stiffness, of an arrow shaft must, in general, vary with its length, there may be wide differences of stiffness in really good arrows of approximately the same size, though the members of a set should have the same index. Another general rule, subject to exceptions like all the rest of them, is that wood of light specific gravity may be more limber than heavier wood and yet still shoot straight. I think that with Norway pine, Port Orford cedar and spruce, from five to six pounds is about right, much more being too stiff for most target bows.

The method of hanging a standard weight on each arrow and noting the deflection leads to equally good results so far as matching sets is concerned. An arrow maker might compile an almost infinite number of tables according to the weights used and the distances between the rests but I will only say here that on my twenty inch pegs a three pound weight bends my good sets of arrows from three-eighths to five-

eighths of an inch, the best steel shaft being exactly one-half inch.

Delamere Magee of Toronto created a beautiful brass scale, fit for the exhibition shelves of a physical laboratory, for testing arrows by the principle of constant weight, a lever or hand magnifying the deflection in the ratio of ten to one. It proves beyond question that the spine differs according to whether the pressure be made on the rift or the reed of the grain. In general the reed, or grain-edge side, is the stiffer but there are a few unexplained exceptions. This confirms the traditional practice of nocking the arrow so that the reed will bear against the bow.

The resiliency of an arrow is more fun to find because the tests are so lively. One very good way that I have heard about but never used is to support the arrow on two rests and drop a hinged rod, or arm, across it from a given height, noting the degree of rebound. My own device is an addition to the wall-pegs that I have described above. Between them and over the linear scale marked on the wall is a wooden bob, weighing a quarter of an ounce, which is free to slide up and down between two silk threads which slip in grooves in its sides. One is reminded of a pile driver. In the test the arrow acts as a bow and shoots the bob upward. To work it one lays the arrow on the two pegs, adjusts the bob to its middle exactly as he would nock an arrow on a bowstring, pulls the centre of the arrow down a half inch and holds it there by a loop of thread guyed to a nail, cuts the string with scissors and watches the bob hop. With most men's arrows it jumps from twelve to twenty inches. Here again a great variety of results, some of which would surely be suggestive of further lines of research, can be obtained by using different weights of bobs and drawing the arrow to different distances.

If the combination of stiffness and resiliency make spine, one would naturally suppose that the best arrow would always be the one that contained the most of those qualities within a prac-



tical weight. Within limits this is a fact but it is not always so. Too much stiffness will throw an arrow sideways. Of the limits of resiliency I am not so sure. Other factors, such as thickness, undoubtedly enter into the problem, as every practical archer knows, and that brings in various qualities of the wood that can only be adjudged by the eye and hand that come from experience. One certain fact is that stronger bows need stiffer arrows but the exact ratio has never, as yet, been worked out theoretically.

Weight is not a good index of spine as applied to woods of different species, although it may be considered among specimens of the same kind. For example I have made arrows of the heavy South American woods like beefwood and, while their weight is relatively enormous, they would buckle so much as to have no value at all.

Fletchers of my acquaintance usually pick over the stock of a lumber yard till they find an occasional board that suits them and lay it aside for purchase. I remember Whitman saying, jocularly, that he had looked over half the lumber yards in Maine before he found his best stock of wood.

The advantage of the coniferous woods, which I will call light woods, is this very quality of lightness in proportion to their spine. Thus an arrow of given weight made of light wood will stand a much heavier bow than one of the same weight made of hardwood. Conversely, with a given bow the arrows of light wood will weigh less and therefore fly farther and with a lower trajectory than if made of hardwood.

The disadvantage of light wood is its liability to fracture. If, on account of wind or a poor loose, the arrow do not fly exactly head on it may hit a target leg or tree and break in the middle of the shaft. More often it hits a stone or the target stand right on the nose and then breaks just behind the pile. The nock, too, will split when cut in light wood. To overcome this last objection the ancient English arrows, like the Chinese arrows of to-day, were made very thick at the



nock end. That is not pleasing to the eye and is most disagreeable to the drawing fingers. One might expect it to affect the flight of the arrow by bumping against the bow in its passage, but I do not think that this would happen. Thaddeus Merriman, experimenting on arrow flight, used a wide, shelf-life arrow rest on his bow and, by putting pigments both on the rest and on different parts of the arrow, found where and how the shaft crossed the plate. The nock was always a quarter of an inch or more from the side of the bow and usually even the feathers did not touch.

The modern way is to strengthen the nock with some other material and the one preferred by most experts is a small wedge of horn, Asiatic buffalo horn being the best, which is stuck into the end of the shaft for about an inch or an inch and a quarter.

There are different ways of cutting the V-shaped notch for this horn. Duff does it very quickly by simply sawing down the two sides of the V with a very fine saw while the shaft is held in a vise. While this method excites my unqualified admiration for the steadiness of hand and accuracy of eye that it indicates, it also seems to me to be wholly beyond the power of the average amateur mechanic. The way I do, and Frentz says he does the same, is to first cut a straight slot down the centre of the shaft with a fine saw and then widen it out to one-fourth inch with a knife file, or a file the shape of a knife blade. After that the procedure is as described for the dowell arrow, the slot being cut through the wedge viewed on its broad sides.

Nowadays hard fibre is often substituted for horn, care being taken that the grain runs the length of the wedge and not across it. It is probably better than steer horn and buffalo horn is hard to get, though it is sometimes stocked by dealers.

Instead of this difficult wedge, a flat piece of fibre or horn set in a simple saw slot is strong enough and is much easier to make, though it is not so good looking.

Nocks of aluminum and tubed or solid fibre have been used with satisfaction. All such materials are either fitted on the end of the shaft as a cylinder around the wood, the nock being cut both in them and the wood within them, or they are made solid at the end and slipped on like the ferrule of a cane with no wood showing in the nock at all.

The breaking behind the pile is usually left to chance but a very good procedure is to strengthen about two inches of the pile end of the shaft by inserting a wire nail. The idea is an old one, as a patent to cover it was granted in 1879 to William H. Wright of Rochester and George L. Thomas of Buffalo. Since then it has occurred independently to the minds of other inventors, notably McMeen, and Knight introduced it commercially in 1926, adopting the name of "ferricor" at my suggestion. A great many fletchers make an arrow of this type nowadays and a good model it is. I have used dozens of them with satisfaction in major tournaments.

The making of a light wood shaft requires great skill for the very finest work but the average man need not despair of soon being able to do a fair job. If you start with an inch board from a lumber pile, as you most probably will, have it sawed at a mill into strips one-half inch square. After this I think it is better to work by hand, except as will be spoken of later under the mechanical manufacture of arrows.

First plane the stick, after cutting it to the desired length of from twenty-five to twenty-eight inches, to a three-eighths inch square with a jack-plane or, better, a joiners' plane. Duff uses wooden planes only but I cannot see why modern iron planes are not just as good.

From now on it is a matter of care and judgment. With a finely set block plane keep cutting the edges off till the shaft is round. It is astonishing how round you can get it with a flat edged plane. Duff uses a half round moulding plane and it is probably a better tool for the purpose if you can guide it perfectly straight. On the other hand the professional makers

of golf clubs that I happen to have seen use the flat blade in shaping handles and they certainly get them beautifully rounded. Duff makes his shafts so smooth with his rounding plane that they hardly need any sandpapering, although he does chuck them in a lathe and paper them a little.

The last five inches at the nock end should be given a slight taper, ending with a diameter of one-fourth inch at the horn nock, but the rest of the shaft should be cylindrical. Nothing is to be gained by barrelling or chesting an arrow.

The last kind of target arrow that I have to describe is the sort that is used by all the experts whom I know of and is put on the market by all fletchers as the *ne plus ultra* of their art. It is the footed arrow, so called because of a footing, or piece of hardwood, spliced on the lower end to give it strength and balance. Footings may be made of any strong wood such as lancewood, hickory, snakewood, amaranth, ebony, rosewood, beefwood, greenheart, bethabara, etc. I think that one kind is about as good as another except that when a dark wood is used the contrast of colors is very pretty, exactly as in a billiard cue. Yet of the dark woods beefwood works best under the plane.

The process of footing is more simple than the finished product would lead you to suspect. You take a piece of the desired wood seven inches long and three-eighths inch square and saw a slot for five inches down the middle of it. Then shape the three-eighths inch square piece of light wood, of which the shaft is to be made, to a wedge for a corresponding distance of four or five inches, cover it with glue and jam it into the saw slot. It is well to concave the sides of the wedge a little as it seems to make a better fit. The thing to be careful of is not to get the end of the wedge thicker than the slot, lest it split the footing when driven home. As an extra precaution the footing may be pinched in a vise while the shaft is being set in it. Wrap a string about the footings while the glue is hardening.

The planing of a footed arrow is much the same as of the simpler kinds except that one must be a little more careful not to run against the grain. In fact it is impossible for the grains of the two woods to run exactly parallel because the footing is sprung out of a straight line by the wedged end of the light wood. Only the eye can guide the fletcher and he must turn the shaft this way and that as he planes around it. He must remember, also, that the light wood is reduced by sandpaper much more quickly than the hard wood of the footing so that if he be not careful the cross section of the splice will become an ellipse instead of a circle.

The old phrase "straight as an arrow" must always be borne in mind. If there be the slightest curvature, even so little that the eye can scarcely detect it, the shaft will not fly true. To find such slight deviations a good way is to balance the arrow at its centre of gravity on the palm of the left hand and give it a spin with the right thumb and forefinger. If everything be perfectly true the arrow will lie flat and steady as it rotates but if there be the least thing wrong it will jiggle up and down. After this test you must carefully sight along the shaft or lay it against a straight edge to find where the fault is.

Bending a crooked arrow back to a straight line will usually not effect a permanent cure though it will help the archer out in a pinch, as when he is lacking in spare arrows during a match. The right way is that used by savages from the earliest times to the present day and by manufacturers of many objects made of bent wood, for instance violin bows. Simply heat the arrow over a flame at the crooked place, bend it straight, either in the hands or, preferably, against something stationary, and hold it motionless until it cools. The Indians bend their bows by pressing them against hot stones and they stay set permanently.

Arrows are not held in clamps of any kind while being planed. It is best to use nothing but a low stop to bear the

Douglas Fir Draft,  $25^{\circ} - 2\frac{3}{8}'' = 3\frac{1}{2}''$

Beefwood footing,  $7\frac{1}{2} \times 3\frac{1}{8} \times 3\frac{1}{8}$

### Wedging the shaft

*The Slotted footing.*

The slot is square-ended

The footing in place

And with wings sawn off

The four corners are planed off

Then it is rounded

Reduced at the ends for pile and rock.

- Fiber root.

174 - diameter

18  
13  
Pile

60°  
30°

Pile and rock placed  
28°

Finally rounded to size and weight—

*The feather*

The finished rock

Feathered

Trimmed



end against and hold the shaft in the fingers. In order to keep out of the way of the plane you can use a narrow piece of board about one inch square, held in a vise, so that you can touch the arrow from beneath or else you can have your stop at such a distance from the end of the work-bench that an inch or so of the arrow protrudes beyond it and can be held by the fingers.

The seasoning of the arrow wood is of paramount importance. Unless it be cured by the new process kiln dried wood is absolutely useless. It is weak and brash and has all the life taken out of it. Inasmuch as a great deal of the lumber which comes from the far West is treated in this way the buyer must be on the watch not to be deceived. If the dealer be honest he will say how it is seasoned; otherwise the poor quality of the wood gives mute testimony against itself.

For the best work the light wood should be seasoned in the plank, under protection in the open air, for at least two years, then cut into one-half inch staves and seasoned in a house, or shed, which is not steam heated and therefore almost equivalent to a sort of kiln, for two years more. Furthermore I am positive, and can show proof of it, that arrows which are made of wood even so well seasoned as this will improve tremendously if allowed to stand for a couple of years after being completely finished. To quote one of many examples I can recall that in 1919 I bought two dozen of the best English arrows and to my great disappointment found that they had not spine enough to stand in a fifty-pound bow. I put them away in storage in a small, unheated workshop that I have and did not use them again until 1924, when I found that they flew perfectly and would stand in my strongest bows, which were about sixty pounds.

It may be that some archers will read this book who live where bamboo and similar reeds grow which may be made into arrows. I understand that the Japanese method of straightening these is to cut them while green and hang them



up with a heavy weight attached to them. Japanese arrows are exquisitely made and are used by many of our expert American archers. Like most of the Japanese craftsmanship that is descended from the older times when modern industrialism had not intruded her malign influence these arrows are works of beautiful and soul-satisfying art. The only fault that I could ever find in them is that they have a very light pile which does not carry quite so well for our style of bows as a heavier one. Some of our best archers change the centre of gravity by pulling off the stubby pile, about one-half inch long, which comes on them, and either adding an ordinary English or American pile only or else, in addition, sticking a piece of steel wire, or wire nail, or a length of lead wire into the hollow end of the bamboo before capping it with the pile.

I had almost forgotten to speak of the pile, important as it is. Bullet casings are very good but if they be drawn back on the bow itself they will deflect the flight of the arrow because of their conical shape. The usual shape used on American arrows is the cylindrical. This is about one and one-fourth inches long, made in a lathe from the solid bar of cold rolled steel, five-sixteenths in diameter, with the point cut off at an angle of forty-five degrees and the other end drilled out like the ferule of an umbrella for three-fourths inch.

The English still make their piles of two pieces, a solid end and a small piece of sheet steel wrapped into a truncated cone and the whole brazed together. It seems a more elaborate process than simply boring and cutting the bar in a lathe, as we do over here, but by practical experience in the use of them I have noticed one advantage. When an arrow with a solid pile strikes a stone the pile is apt to be rammed back against the shoulder of the footing which is flush with it so hard that the wood is burred and chipped. Of course, in making the arrow, care must be taken to have the end of the shaft completely fill the pile but even then a hard blow will have the effect I mention. A brazed pile, under the same conditions,

will usually split and not hurt the shaft, so that it can be pried off and replaced by a new one. I do not, however, think that the English gain anything by slightly tapering the pile but, on the contrary, I think that if a tapered pile be drawn back on the bow it tends to deflect the arrow as I said in regard to the bullet casing. In *American Archery* Mr. Z. E. Jackson, of Kansas City, told how he made piles in this English manner except that he used Shelby seamless tubing and soldered the tip on instead of brazing it. He also swedged the tube to a taper because he said that a cylindrical pile at once opened a full sized hole in a target and thus made it easier for an arrow to go through. My experience does not lead me to agree with him in this last particular as I have many arrows with both kinds of piles and can see no difference in their power of penetration.

To make the piles stick on tightly some fletchers use ferrule cement, which is like sealing wax and worked in the same way by heat, some use glue, some depend only on a tight fit and some others make a dent in the pile or drive a pin through it. All of these ways are good. If arrows, even of the best seasoned wood, be kept in the dry air of a steam-heated house all winter they will contract so much that in the spring their piles will come off. This can be corrected by standing the arrows in a glass of water about two inches deep before using them or by pulling off the pile, wrapping a little piece of paper around the wood and driving the pile on again by shooting it against a board or tree.

When speaking of long feathers I mentioned some experimental arrows that McMeen made after specifications which we had arrived at in conversation. The principal other feature was that they were black, both shaft and pile. Our thought was that the field of vision on a brilliant, sun-lit range is very light and therefore a black arrow would show more clearly to the eye than a light colored one. This idea, extended to the pile, led McMeen to have them treated by the

Bower-Barff process, by which they are oxidized to a grayish-black shade. The feathers were supposed to be dyed black but in reality they came out of the coloring bath a very dark and handsome green. Like so many things that sound well in archery these theories were found to have no great practical value. It is true that the arrows were good ones but they were no better, nor more easily sighted than ordinary ones.

Arrows are usually made in sets of a dozen but you will soon notice that even if you cut your shafts from the same board and make them of the same diameter they still will not weigh exactly the same. The chief reason for this variation is that the layers of wood are not uniform and some arrows will have a denser structure and greater weight than others. It is best to make up a larger number of shafts than you expect to finish, or at least use in one set. About eighteen is a good number, as a dozen can pretty surely be picked from them that will be fit to use together.

The question of the centre of gravity, or balancing point, of an arrow is one on which archers have debated so long and so vigorously that I am glad to be able to put an end to their discussions by giving an opinion which seems to me to be final. It is contained in a letter from McMeen and states the matter so concisely and well that I will simply quote his own words in full:

“Every so often there appears among archers one who has the obsession that an arrow will fly more accurately if the balancing point be brought away forward of where it appears in commercial arrows, and if he have a friend who is a fletcher he beseeches him to make a dozen with the centre so placed, say at three inches from the pile’s tip.

“Sometimes the fletcher tries to do that, but not if he have the vision of the underlying laws of physics; for there is a law that says:

$$\frac{Lw}{2W} = X$$

where L = the length of the arrow,  
 w = the weight of the arrow without the pile,  
 W = the total weight of the arrow with pile on.

“Under this law, which is simply that of a loaded beam, the three-inch requirement states thus:

$$\frac{28 \times 300}{2W} \text{ (the weight minimum of a shaft) } = 3.$$

“Solving this one gets  $W = 1400$ , the weight of the finished arrow!

“Imagine shooting such a missile at 100 yards.

“But there is worse to follow: I have had archers ask for arrows with the balancing point an inch from the pile tip. The weight of the pile for that kind of arrow will be 3,900 grains, or 400 grains more than half a pound.

“A fellow can break the commandments and the Volstead Act, but not the laws of the universe.

“Now there is an interesting conclusion to be drawn from all this. It is based on the fact that, if made of known materials, no shaft is stiff enough to fly true unless it weigh 300 grains. Also no shaft is good for the York Round unless it weigh under 451 grains. Assuming the minimum pile to weigh fifty grains, as an example, then the limits of the balancing point are these:

Shaft — 300 grains,	} Balancing point, 12 inches from tip to pile.
Pile — 50 grains,	
Total — 350 grains,	
Shaft — 300 grains,	} Balancing point, 9½ inches from tip of pile.
Pile — 150 grains,	
Total — 450 grains,	

"Which means that in a practical arrow one cannot get either way from these limitations *at all*."

I have known many amateur fletchers who made their first arrows from written directions, without having seen any of the best work of professionals. Many of these shafts were very good, reflecting credit on the intelligence of the maker but without any exception they all had the same fault, a lack of finish due to the failure of the craftsman to appreciate the extreme care and delicacy with which the best arrows are made, an exactness such as is used in the making of instruments of science, as indeed they are.

My best arrows do not differ in weight more than one grain in most instances, with an extreme variation of three grains. For ordinary work a maximum of ten grains may be allowed but the closer you can come to uniformity the better.

Weight and size are not always in constant relation. Even from the same stock of wood arrows of the same diameter will differ in weight according to their microscopic structure.

After all, as the final proof of the pudding is in the eating, so the final test of the arrows is in their shooting. A set may look exactly alike to the eye and yet when discharged from a strong bow show considerable individual variations.

If you select a day on which you feel that you have unusually good command of the bow, number each arrow and plot on a paper target where it hits. To your surprise you most likely will find that after many ends, say at sixty yards, number six will be making an average of nine o'clock blue, number twelve perhaps four o'clock red, another may be going high and frequently missing above the target and so on. It is rather discouraging to find your marksmanship altered by the missiles themselves but the situation may be controlled. If your stock of arrows be small you will simply have to learn the vagaries of each shaft for each distance and allow for them in your aiming, but the best way is to experiment until you have found six that will fly the same. Of course six that will

fly straight for the gold are the ideal to be striven for but if you get six that fly with the same error the eye will soon allow for it and you will do almost as good work with them.

I think that the only two features of an arrow which still remain to be discussed are its length and weight. I have already said that twenty-five inches is the usual length of arrows for women and children but that presupposes people of average size, say five feet six inches. A woman of five feet eight inches or more can often shoot more comfortably with a twenty-six or twenty-seven inch shaft as she can then extend her left arm out stiffly as she ought to do. On the other hand little children of twelve or less can do better with a twenty-one-inch arrow.

Arrows for men are standardized, and have been for time out of mind, at twenty-eight inches. Nevertheless, a great many of our best American archers prefer a shorter shaft. Roberts uses twenty-seven inch, Taylor twenty-six, and so on for a long list, though I know of few who descend to twenty-five. I stuck to twenty-eight till 1927, then shot an inch less for four years and at present I am back to standard again, though whether I shall stay there I do not know.

The weight of arrows is not a figurative expression, as it is with bows, but means exactly what it says. The English and Americans have different conventions regarding the expression of weight, we simply stating it in grains, which seems to us to be simpler and more exact, and the English using the monetary terms of shillings and pence.

The shilling of archery is a weight of eighty-seven grains and the penny is seven and one-fourth grains. In actual practice only the quarters of the shillings are used, the arrows for example being 4-3, 4-6, 4-9 and 5, meaning four shillings three pence, etc., but they are never 4-1, 4-8 and so on. This permits a latitude of twenty-one and three-fourths grains in a set of arrows with the same marking which is entirely too great a margin of error. As a matter of fact the English fletchers



balance the arrows of a set against each other and simply mark them within the three penny weight because, as I said, a dozen arrows may be within one grain. Furthermore I have two sets of 4-9 arrows from the same maker which balance perfectly with their mates but each set is decidedly different from the other. Our American way of saying 370 grains, 406 grains, or whatever the weight really is seems to me to be much better.

Ordinary balances, such as the classic figure of blind Justice always holds, are as good as any for weighing arrows, which may be kept from rolling off the scale-pan by a little bent piece of paper or one pan may be taken off and replaced with a frame of bent wire of the same weight. Ladies' arrows should weigh about 3-6 to 3-9. Men's twenty-eight-inch arrows should not weigh less than 4-3, or 370 grains, which will have enough spine for a thirty-six or forty-pound bow, and it is not necessary to go above five shillings or 435 grains for any but the heaviest bows such as most of us cannot manage at target shooting. The best all 'round weight is 4-9, or about 414 grains.

Though a scale or balance is essential for mating arrows, here is a novel aid: At 9.45 p. m., April 18th, 1932, as Palmer, Rounsevelle and I were watching Dr. Pillmore exhibit his slow movies of the archers' paradox, Bill suggested that if arrows of the same diameter and weight of pile were floated in water, or water with alcohol, or in oil, they would protrude at various elevations and thus be easily grouped for specific gravity or weight. With the doctor's deep developing tanks at hand we at once tried it out. It is a fascinating trick but, as yet, the results have not been tested in the bow.

All of these weights are for footed arrows twenty-eight inches long. I do not know just what self-arrows should weigh, though the difference ought not to be very great, and of course if a man make a short arrow the weight may be somewhat less and yet the shaft be strong enough. It is better to err on the side of too heavy an arrow than too light a

one and I have read of one husky Irishman who shot a 100-pound bow and nine-shilling arrows.

Now I am sure that from reading this long description of the processes of fletchery you have at least come to realize that the making of arrows which are exact mates is not an easy matter. To me these puzzling variations add to the interest of archery much as the individual characteristics of our friends react on us in our wider lives. Duff has expressed this feeling with quaint delicacy in some verses written in his mother tongue. They describe the musings of an old archer who looks over his last half-dozen arrows; a father soliloquizing on his wife and five daughters:

Eh yer bonnie in yer feathers an' yer pent an' tinsels braw  
But yer jist like ilka lassies, kinda dour an' unco thraw.  
Ye'll only gang yer ain wey but that wey's no fer me  
Ye een maun tak the stracht road as weel as please the ee'.

An' you, ye muckle hussy, weel I ken ye, Number Twa.  
There's no a chiel can trust ye as faur as yin can thraw.  
Ye'll hae tae men yer mainers, my dainty wee bit quean.  
I canna staun yer flirting richt before my verra een.

An' here's a sonsy limmer in her Easter brows sae fine,  
Tae delicht the een o' man-kine, but she raises wrauth in mine.  
Gin I sen her on an errand she'll begin tae dance an' sing.  
Man, she louns jist like a Scotsman when he daes the Hielan fling.

An' then, thou dear auld faithful, in the past ye've din yer pairt,  
But noo yer frail an' cranky an' it fairly sears my heart  
Tae think again o' byegane days when ye were in yer prime;  
Noo, like masel, ye'll tak a rest, I'm feared we've had oor time.

An' noo, my last two dearies, Number Five and Number Six,  
Yer jist as true as ever withoot ony kittle tricks.  
Had I a wheen mair like ye I wad let the hale warl ken,  
They could pin mair faith in lassies an' no hauf as much in men.

I think the foregoing pages cover the subject of making arrows by hand about as thoroughly as need be but within the

present century various processes of expediting and standardizing the work by the use of machinery have been devised.

One of the favorite ways, in factory production, is to cut the shafts out in oversize by a dowel-cutting machine, foot them by hand, trim the surplus wood off the foot with a hand plane and reduce to final shape on a power-driven sanding table. The outfit is very expensive.

Some fletchers foot several arrows, from three to six, by fitting an end-tapered board of soft wood into a V-notched hardwood board of equivalent cross section and then sawing the whole into arrow shafts. It is the principle of footing a single arrow stave but applied to a board.

Many others use a hand dowelling tool on an ordinary wood turning lathe to produce an oversize stele and then reduce it with a plane as already described.

One of the best methods, in my opinion, was worked out by McMeen and adopted with more or less variation by Shepherdson and others.

I refer to turning arrow shafts on a lathe. To the layman this might seem to be a very simple procedure, and he might also wonder why a modified machine for making dowels, or lead-pencils, would not turn out arrows as fast as might be wished. The objection lies in the fact that all such methods either fail to give perfect straightness or else take away some of the spine of the wood, by a loosening of the fibres.

No matter how fast a lathe may turn it will not make as stiff an arrow as can be made with a plane, if the cutting instrument be a chisel.

McMeen devised the rotating cutter, which consisted of a milling wheel spun at great speed by a small electric motor. This was attached to a travelling chisel-rest and was fed along the rotating shaft at a slow speed, so that the wood was taken off in the form of dust so fine that it floated on the air. Later, a carborundum wheel was substituted for the steel cutter and served just as well. Shepherdson uses a steel wheel

covered with sandpaper, or perhaps garnet paper, which cuts perfectly. I have seen him make a shaft in about a minute, giving the final taper of the shaftmond by turning the handle which sets the cutting wheel a little closer to the wood.

Mention should also be made of the use of jigs, which so kindly guide our wavering hands. For cutting the V for the nock horn in the end of the stele, one may take a short length of three-eighth inch pipe, saw and file a notch an inch and a quarter long in one end and insert a set screw through the side. To operate, slip it over the head of the shaft with ends even, tighten the screw enough to steady the wood without crushing it, and, with a hack saw, cut out the wood that is exposed in the notch of the metal.

Just as good, or even a little better, is a wooden mitre block made essentially like this:—In a block two inches thick by three square, a V-shaped furrow one-half inch in width and depth is cut across the middle of one of the broad sides. A line is now drawn across a narrow side, perpendicular to the cut side and one-eighth inch from the centre, and therefore bisecting an arm of the V made by the end of the furrow. A saw cut, identical with this mark, is carried down at such an angle as to reach the deepest part of the furrow, or centre, at one and one-quarter inches. To operate:—Lay a stave in the furrow with its top level with that of the block and hold it tight with either fingers or clamp. Saw down in the slot to its bottom, thus making a sloping cut half through the stave, then turn the stave half around and saw down again, the two cuts thus joining to form a V of the right size for a nock-horn.

The planing of arrows can also be much facilitated for most of us if we use a form of shooting-board. In my opinion this word would more properly be spelled chuting-board, as the plane runs in a chute. To make one, take a slat of two or more inches width and twenty-eight inches length, leave a half inch of it open down the middle and nail or glue to it two narrow strips that are of the same thickness as that desired

for the arrow. These are to serve as tracks or rails for a small block plane to run on. Near the edge, or as far apart as the width of the plane, fasten two higher strips as side guides for the plane. Grind off as much of the cutting edge of the plane from each side as will allow it to run free on the tracks. To operate:—After reducing a square shaft to an octagon or rough round by free hand planing, lay it in the trough and run a finely set plane to and fro over it with very light pressure and while turning the stave after each stroke.

Few men have investigated this question more thoroughly than McMeen and so I have asked him to let us have the benefit of his opinions in a separate paper. If it repeat some things that have been said earlier in this chapter, it only shows them in a clearer light because of the different angle. I would add as a word of caution that if any step in the use of the abrasive book be different from that which is recommended, the rift of the arrow wood will wear off more quickly than the reed and the shaft will become elliptical in cross section. Personally, I have had the best success with the book when I used it by hand. It should be said, too, that most archers prefer the wedged nock to the one of tubular pattern.

#### MECHANICAL AIDS IN ARROW MAKING

*By S. G. McMeen*

The processes of arrow making are largely hand methods, as the art is principally practiced, yet the requirements are those of quantity production. That is, in the making of target arrows, it is necessary that all of a lot shall be as nearly exactly alike as possible, and that all of them be turned out at a reasonable cost. Quantity production addresses itself to the making of a great many things exactly alike, and at minimum costs. There is much to be gained in adopting these principles in the arrow making art.

These notes are the result of an effort to utilize machine methods in a part, not all, of the steps of making target ar-

rows. There are some steps for which it seems that hand methods must still be used, not because there is no machine method possible, but because the hand method seems to be better adapted to the particular needs of those steps. In other words, with the mechanical processes available to modern industrial practices, some of the hand methods of the past still have the advantage of being less fussy.

The best target arrows are always footed. The footing is always applied to the soft wood of the shaft by what might be called the "clothes-pin" method, in which the footing is slit and slipped over the wedge-shaped shaft. The technique of this first step in the making of a target arrow is this:

The footing is made of hardwood—beefwood, snakewood, amaranth, lancewood, preferred by the writer in the order mentioned—and is ripped on a saw table into prisms  $7\frac{1}{2}$  inches long by  $\frac{3}{8}$  inch square. Each piece is then slit up the middle on the saw table with a novelty saw for a distance of say six inches. This is an incomplete cut, for the reason that the novelty saw leaves the cut rounded at the end, the shape of the saw, and what is wanted is a square-ended cut. The cut is then completed on a jig-saw or on a band-saw, as is convenient, and in that process the cut is made square-ended; that is, is compelled to come out at right angles to the length of the piece, so that the wedge-shaped shaft may fit into it.

It will be remembered that it was said that the circular saw cut in the footing was made with a novelty saw. This is a tool too little known. It has no set; it has both long and short teeth; in a cross-cut novelty saw five inches in diameter there are sixty short teeth and twelve long teeth. In a rip novelty saw of that size there are forty-two short teeth and fourteen long teeth. In both cases the intention and the performance are to produce a very smooth cut. As the wood leaves the saw it is as smooth as if planed. This is the reason for the choice of such a saw for use on the hardwood part of the joint between footing and shaft in a target arrow. For if the cut in



the footing be rough the roughness will show in the finished arrow. This is because the footing material is hard, and also because of its usually dark color. On the main shaft the facts are otherwise. It is, and should be, sawed with a rough-cutting saw, in order that the glue may grip best, and no matter how rough the cut on that soft wood there will be no optical unevenness in the finished joint.

The wedge-shaped end on the forward portion of the soft-wood shaft is also made by sawing. For this is used a jig or guide running in one of the guide grooves of the saw table. Almost all saw tables have such grooves, provided for the direction of the cross-cutting guide. The latter is not used in this step of the process, but instead there is made a strip of wood formed and equipped as shown in Figure 1, bearing on its under side a strip of metal fitting the guide groove. This strip of metal is set at an angle to the length of the piece of wood, so that the shaft square laid along its side has also an angle to the cut of the saw. This angle is just that required to bring the wedge into conformity to the slit in the footing.

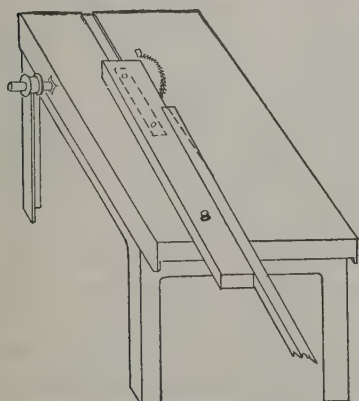


Figure 1.

The taste of the fletcher usually governs the amount of solid footing left behind the pile, but from  $1\frac{1}{2}$  to 2 inches is customary. If the rear screw that fastens the metal guide to the under side of the wedge-cutting jig be arranged to work in a cross-wise slot in the wood guide, the angle of the wedge can be adjusted to suit the footing slit if that be varied from time to time.

The right-hand side of the jig has a cut on it to receive the three-eighths inch square stock of the shaft, and, fitted to this

cut, the shaft, accompanied by the guide, is fed forward. The rip saw slices off a triangular prism from the shaft. The latter is then turned over and a cut taken from the opposite side, at which point the wedge is finished. The whole operation takes just ten seconds, is done with slavish exactness, and is a considerable improvement over hand planing in its uniformity and speed.

The slit cut in the footing and the wedge formed on the shaft, the next step is to glue the two together. The most exacting and conclusive tests have determined that casein glue is the best material for this purpose. These are the reasons principally applying to the case:

Casein glue is water-resistant to a degree almost warranting the term "waterproof."

It is worked cold, and does not "cheese" (set jelly-like) as does hot glue.

It has greater strength than the best hide glue, and still greater strength than any liquid glue.

These are all qualities demanded by the requirements of a good target arrow.

Casein glue is a cream-colored dry powder, looking something like very fine cornmeal. It is mixed according to maker's directions, these usually calling for the union of one part of the dry glue by weight with one and eight-tenths parts of water by weight. (An ounce of water fluid measure weighs one ounce avoirdupois.) An egg beater is good for mixing. In half an hour after mixing the glue is ready for use, having in that time changed from a stiff paste to a semi-fluid mass. This material is then smeared (a spatula or palette knife is a good applicator) on the wedge of the shaft and into the slit of the footing and the two slid together. A clamp on the footing just above the slit prevents it from splitting if the fit be close, but if everything has been done with nicety that will not be necessary, though in the earlier trials it is a wise precaution. Whether clamps are necessary along the joint also

depends on the fit, but there too it is well to err on the side of a little extra work and put them on. Three are a maximum.

In six hours the glue will be dry enough for the work to proceed. The next step is to get rid of the extra wood that is projecting from the sides of the joint, where the prongs of the footing are forced outward by the wedge. This is done on the saw table, and is shown in Figure 2; here too a jig is used, but this time it is guided by the regular side guide of the saw table, and not by a special groove-strip. This jig is merely a strip of wood having a notch for the wing of the footed, rough shaft, and the task is only to rip off the footing excess on

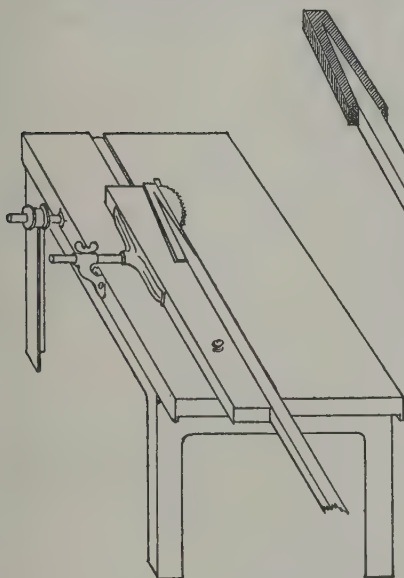


Figure 2.

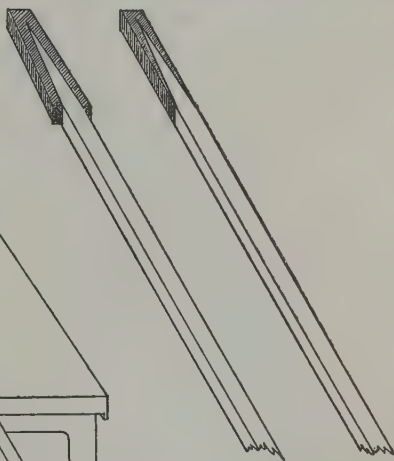


Figure 3.

each side. When this is done the footed stick is again a three-eighths inch square, as the softwood shaft and the foot were at the beginning. The saw, it should be added, is a rip saw with the usual set, as it does not matter how rough is the cut.

Figure 3 also shows the footing before and after sawing off the wings.

At this point the process for the first time leaves the realm of pure mechanics and becomes a hand method. The squared shafts are now laid in a V-shaped groove in a heavy strip of wood and planed off as to the four corners until the shaft is an octagon. (The V groove is well made by applying two bevel-edged strips to a four by four inch piece.) The octagon is now ready to be made round and for that purpose we need a new tool.

Figure 4 shows that tool, and it is what has been termed by Captain Cassius H. Styles a "book." It is book-like, and

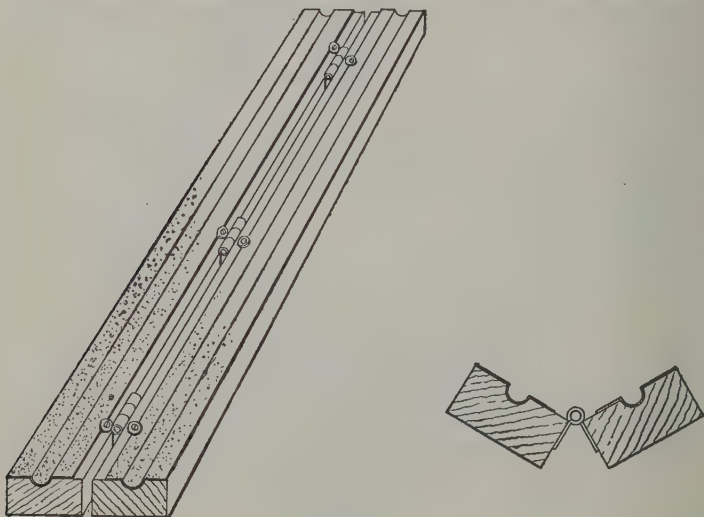


Figure 4.

is made of two strips one and one-eighth inch by two and one-fourth inch, hinged together. Each of these strips is provided with a half-round groove, so related that the two grooves combine to make a perfectly straight round hole through the device.

The "book" is further lined with garnet paper. This paper is held in place in each half of the device by means of screws and washers. One of the little conveniences of its structure is to have the washers soldered to the heads of the screws and to tighten the left-hand screw first in attaching the garnet paper to the "book." This allows the sliding of the paper, if any takes place, to be taken up by the sliding at the next screw.

This garnet paper tool is thirty inches long. The strips of garnet paper are two inches wide. The grooves are one-half inch wide and so the hole they form through the book is a one-half inch cylinder. When lined with the garnet paper this will cut, as we shall see, to five-sixteenths inch or less, depending on the use. The garnet paper lining is pressed into the grooves by clamping a rod of metal between the halves at the groove and pressing the halves together in a vise.

The octagon shaft is now placed in a lathe by its end, with the slide rest and tail stock removed, and spun at a rate of 2,500 revolutions a minute. The garnet paper tool is placed over it, hinges upward, and gently closed around it. The abrasive will at once reduce the octagon to a round shape, and in a very short time the arrow will be a nearly finished shaft. It is well to slide the tool endwise in an oscillatory motion during this abrasive process.

During the latter portion of this brief forming of the rounded shaft, it is necessary to watch the diameter of the missile. Sliding calipers are a convenience at this stage, as one can read the actual diameter in that manner. Another convenience is a scale of the gravity type, for weighing the shafts. These may best be of the type that reads direct in grains on a scale without the need of balancing.

It will be remembered that we have referred in the foregoing to garnet paper and not to sandpaper. There is a sharp distinction. Garnet paper is coated with crushed garnets and sandpaper with sand. There is no sort of comparison in their

performances as abrasives. The former is preëminent for use on wood. There are special reasons for its use in fletchery. The spine of an arrow is its most essential qualification. Every other quality is secondary to that. This spine depends on the nature of the union between the cellulose and the resin of the wood. It is never better than provided by nature, yet it may be made worse by undue application of heat. To work on an arrow by any process that destroys this union between cellulose and resin will injure the spine of the resulting shaft, and one such method is to heat the shaft unduly in its process of forming. Now too fine an abrasive in the tool for rounding will heat the shaft unduly, and so will too slow speed. *Therefore:* run the shaft at high speed (2,500 a minute or so) and use No. 2 garnet paper. This is a coarse grade and cuts cool because coarse. The finer grades are sure to heat the wood and should be used only for finishing, where the cut is light and short.

At the end of the book-forming the shaft is round, and ready for the pile and nock. Both of these, in one of the successful processes, are attached in the same manner. The process to which we refer is that of providing the nock with external rather than internal protection against splitting. The only purpose of horn or aluminum or fibre at the nock is this protection against splitting, and anything that will accomplish that and give reasonable drawing-finger comfort is acceptable. The use of aluminum is objectionable because of the softness of the metal and its inability to stand the shock of being struck by another arrow in the target. The best horn nocks will split when the weather is cold, and often when it is not. The only indestructible nock is the externally applied vulcanized fibre nock.

This is made in the following simple manner: Provide a tool as shown in Figure 5, which is nothing but an end mill. That is, it has teeth cut in its end and is hollow, and has a stop. The latter is merely a screw with a tightened fit, en-



abling the length of the cut to be governed. It is placed in a chuck in the tailstock and the shaft is placed in a collet in the hollow spindle of a lathe, the main body of the shaft lying in the spindle. The latter is spun, while the tool in the tailstock is fed up to it. In one second the diameter is reduced to that required for the attachment of the pile or nock.

In my practice, the internal diameter of the pile is seventeen sixty-fourths inch, and of the nock seven thirty - seconds inch. The two tools (end mills) are of corre-

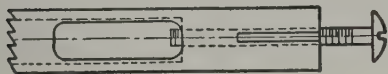


Figure 5.

sponding diameter, allowing room enough for the cement of the pile and the glue of the nock.

The pile is of the usual American type, made from cold rolled shafting, five-sixteenths inch outside diameter, seven-teen sixty-fourths inside diameter, with a nose of sixty degrees included angle, which is rather sharper than may be preferred by all archers. This pile is turned from the solid stock, and has no taper except at the point. That is, it is in the main cylindrical, which by exhaustive tests shows itself to have no less stopping power than a conical pile and so is in all ways to be preferred. The English makers have expressed but one objection to a pile turned from solid stock, and that is that the oil in it, left from the turning operation, interferes with the holding power of the glue used in attachment to the footing. To this there are just two things to be said: First, that there is no need for oil to remain, as gasoline will wash it out, and second, that glue is worthless as a pile attachment, particularly in a dry climate like that of the United States generally. The only satisfactory material for pile attachment is ferrule cement, used principally by makers of fishing rods. If a good grade be secured—and trial alone can tell as to that—there is nothing better.

To use ferrule cement, heat the end of the footing in a

Bunsen gas flame, heat also the stick of cement, spread the cement on the footing, where it will flow; then heat the pile and place in position, holding it there while you cool the pile in water. If the fit is so close from your tools that air is imprisoned to such a degree as to tend to push the pile off before the cement cools, then a preliminary step is required, this being to file a slight flat lengthwise on the shaft where it is reduced for the pile, so that the air can get out. This is always good practice.

Now as to the nock. Please recall that we are discussing the external, fibre form. It is to be made by cutting up black fibre tubing, five-sixteenths inch outside diameter by seven thirty-seconds inch inside diameter into pieces seven-eighths inch long. The shaft having been reduced to receive them by means of the end mill, as has already been described, the sections of fibre tubing are slipped on and glued in place by means of either hot hide glue, casein glue or any good liquid glue, the reason for the large liberty of the glue being the absence of any great endwise strain on the nock in shooting. The blow of the string on the shaft is entirely insufficient to start the nock whichever adhesive is used. Its position against the wood of the shaft helps as to that.

The arrow is now complete except as to feathering, the best way of doing such work being described elsewhere in this book.

After feathering comes the painting between the feathers and the painting of the crest or distinguishing mark of the archer. Here again much saving of time and a superior quality of work are made possible by the use of tools. The painting tool that is most satisfactory is shown in Figure 6, this consisting of a motor and an accompaniment of parts, the whole constituting a miniature lathe with a hand rest. It is hoped that the drawing is self-explanatory, but it may be added in words that the motor at the left is of the sewing machine type, that the hand rest is cut out to allow the feathered arrow

room to revolve, that there is an intermediate rest to prevent excessive vibration, and that the right hand stop that receives the pile end of the arrow is provided with a concave centre. The two breaks shown in the base are merely introduced to shorten the sketch. The device is actually about three feet long.

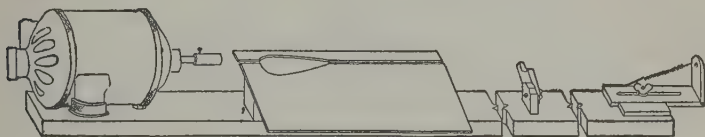


Figure 6.

There occurs to us as meriting description one more mechanical aid, this being the device for cutting the nocks in the fibre ferrules. In any nock the best practice requires that the portion at the bottom of the nock be *curved two ways*. This is, the bottom of the cut must be round in one direction to fit the roundness of the string, and also must be round in the direction at right angles to that to fit the *curve* of the string. For when the arrow is released, the string, freed from the fingers, is bent into a curve in the nock. Surely there must be no sharp corners left there, or the string will wear too fast. The point is not a great one, as to this latter curve, and arrows will shoot well without such treatment, but archery is made up of niceties and perfections of equipment. The best arrows one sees have both these curves.

The device for cutting the nock does three things, practically all at once, and in a few seconds. It consists of a small saw, with a rounded edge, as thick as the nock-cut must be wide, on the side of which is clamped a disc of fibre or metal just as much narrower than the saw as the depth of the nock requires. This disc is to serve as a stop for the end of the arrow when the nock-cut is deep enough.

There is placed before the saw a fixed support with a semi-

circular cut in it, to serve as a rest for the arrow. This only barely clears the saw. That is all the rig.

To use it, the arrow is laid in the rest and pressed home toward the saw while the latter runs. This cuts the nock to the required depth and automatically stops cutting as soon as the arrow touches the fibre or metal disc's edge. But the nock now has roundness one way and concavity the other way. The latter is instantly changed by first bringing the pile end of the arrow up, then lowering it (above and then below its horizontal position), while holding it in against the disc's edge. That is all. The cut now is rounded two ways.

### XIII

#### ROVERS

WE twentieth century people have so standardized our sports that they have lost much of the spontaneity which to many is one of the chief sources of pleasure. Veteran archers, with years of painstaking study behind them, naturally wish to avail themselves of the fruits of their work by accurate shooting at the target, under strictly specified conditions, and making satisfactory scores. So, too, does the enthusiastic student who is developing his technique in the hope of reaching those Olympic heights.

Yet there is a large class of men who wish to shoot the bow and arrow in a freer manner, without care and without worry, just for fun and to find relief from the cares of work. For them the ideal form of archery is the ancient game of rovers.

It certainly is older than golf by at least twenty-five thousand years, for it is essentially what the Paleolithic cave man practiced when he shot at random marks to gain the skill necessary for killing his daily supply of meat. It is what the military archers of every race have done from time out of mind to the present day. It has the sanction of vast antiquity and yet fits easily into our modern life with the same thrill that it gave to primitive man.

I seriously think that there is excellent evidence for thinking that golf is a derivative of roving. It is true that knocking a stone from one dirt hole to another with a stick may have a primitive origin in the human psychology, but the long distances between golf holes, the desirability of an irregular terrain as in roving, the fact that golf developed among peoples who were skilled in roving and accustomed to playing it, suggest that if roving were not the actual predecessor of golf it had at least a great influence upon its development.

Roving in its original and primitive form means shooting at casual marks which may present themselves to the notice in the fields, such as trees, bushes, patches of colored earth, and the like. These marks are called *rovers*, and from this the pastime itself is sometimes known as rovers.

At the end of a day's work anybody can take his bow and a pair of arrows and go for a pleasant ramble before the sun sets. He may shoot a lonely way from tree to tree, or if a friend be with him, so much the better.

The most agreeable development of this form of the sport is a regular roving party. A few years ago I rented a small and ancient stone cabin on the edge of the "Hundred Mile Woods," in which lies Valley Forge. We called it "Forest Neighbor." Sometimes in the brisk weather of the fall and early winter, when the garnered crops left the fields free for finding the shafts, a party of congenial men would assemble there for an afternoon of roving, to be followed by a good supper beside the open fire, the table lit with hand dips and the flickers of the firelight playing in the deep recesses of the windows and among the unhewn beams of the ceiling. On one of these cozy occasions the most talented member of the group drank so many cups of coffee, brewed from rain-water to extract its full value, that when he retired for the night he found that Apollo would not give place to Morpheus and demanded his service with the lyre as well as the bow. During the evening the talk had centered on ancient ballads and chanteys and so, in the depths of the night, he sat in his pajamas and to a peculiarly compelling metre fitted these verses, the best picture of roving that words have ever drawn:

A-roving! a-roving! Oh, who will go a-roving,  
To sight a target in the mead,  
To watch the feathered missile speed  
And quiver like a plumed reed  
To draw you on a-roving,  
A-roving, a-roving,  
Across the hills a-roving till daylight dies?



A-roving! a-roving! Mark well the flight a-roving!  
 Give heed the bowstring's twanging sigh,  
 And watch the humming pot-shot die  
 In Heav'n and drop from out the sky  
 A winged wand a-roving,  
     A-roving, a-roving,  
 Come back to you a-roving till daylight dies.

A-roving! a-roving! Lift up your eyes a-roving!  
 O'er all the woodlands' magic sway  
 Behold the wonder of the day  
 And let the fancy freely play  
 To yonder hills a-roving,  
     A-roving, a-roving,  
 Adown the valleys roving till daylight dies.

A-roving! a-roving! The dusk comes on a-roving!  
 At Forest Neighbor on the hill  
 Is found the wherewithal to fill  
 The last desire; completely still  
 The hunger born of roving,  
     Of roving, of roving,  
 The appetite from roving till daylight dies.

A-roving! a-roving! The time is past for roving!  
 Put on a log and let her roar!  
 Another glass! Foot up the score!  
 Good fellowship brings more and more  
 Of happiness to roving,  
     To roving, to roving,  
 To happy days a-roving till daylight dies.

—MARK H. C. SPIERS,  
 23 November, 1919.

The "pot-shot" of the poem means shooting directly upward with all the force of the bow and attempting to hit some object close at hand, like a stump or a hat thrown on the ground. It requires very nice judgment, as the wind will carry the shaft an astonishing distance. In no form of shooting has the skill of our forefathers been more grossly exaggerated.

gerated by both modern and contemporaneous writers than in this. You remember how Conan Doyle makes his young Saxon shoot high in the air and drop on a stump, and I find, as an example of ancient hyperbole, this scene from one of the old Scandinavian sagas: "King Olaf took a spear, and put its point into the ground; then he placed an arrow on the string and shot into the air; the arrow turned itself in its course, came down with its point into the end of the spear-shaft and stood there upright. Heming took an arrow and shot, it went very high, then the arrow point came down into the shaft of the first arrow."

During my lifetime, and perhaps for a generation before, this style has been called "Turtle-back" shooting, because the Indians along the Orinoco River are said to kill the big turtles in this way. I had privately considered this to be a first cousin to a fish story until a few years ago when I heard Professor Farabee, of the University of Pennsylvania, a great authority on those regions, give an illustrated lecture in which pictures occurred which showed giant turtles lying side by side in vast numbers. Instantly the possibility of shooting them by a falling arrow became perfectly obvious and although I was disappointed in having the doctor tell me that he had never seen Indians kill them in that manner yet I am sure they could if they wanted to and my impression is that he shared the same opinion. In roving it is naturally a dangerous kind of shot and should never be attempted if there be any doubt of everyone's being able to follow the arrow with the eye. I know a gentleman who pierced his niece's hat brim and pinned her skirt to the ground between her feet.

It seems to me that there can be no better place than this in which to speak of the competition between an archer and a golfer in the hybrid game called archery-golf. Just when it was played for the first time no one will ever know and I should not be surprised to learn that it is as old as golf itself. As I have said before, there is so much similarity between golf

and rovers that the enthusiast in one naturally thinks of it when he sees the other.

The first record of such a contest that is known to me occurs in Paul's *History of the Royal Company of Archers*, as follows:—"Although we believe that it was shot some years earlier than the time we are now dealing with (1842), we may here mention a curious match which came off on the links at Musselburgh between a member of the Royal Company, famous for his prowess in archery, and an equally good proficient in the fine old Scottish game of golf. The match was between a golf-ball and an arrow, the conditions being that the ball was to be driven and the arrow shot over the usual golf-course; but in order to equalize matters, it was arranged that the arrow was to be shot straight down to the bottom of each hole, the mere fact of its sticking slanting-wise in the side of the hole not being sufficient. This, of course, gave the ball a better chance at the holes; while, on the other hand, the arrow had an advantage over the course, as it could not be affected by getting into 'bunkers.' The match terminated in favor of the arrow; but the contest was pretty close. It was probably the only competition of its kind which ever took place; and we fancy that the old legislators of the realm would have stood aghast could they have seen the 'unprofitable sport' of golf pitched against their favorite art of shooting with the bow." I would add in comment that the great golfer, Mrs. Dorothy Campbell Hurd, a Scotchwoman, whom it was my privilege to instruct in archery, told me that the holes of that day were quite irregular in size, were often scooped by hand out of the earth and were not lined with metal as they are now.

My first experience was in the fall of 1910, before I had ever seen another archer shoot, not only at archery-golf, but at anything. It was a nine hole game on the course of the Saint David's Golf Club, about a mile from my home, and my opponent was the club champion, Frederick J. Wendell. We halved the game for both medal and match play, winning

an equal number of holes and making a gross of eighty-one. I shot at a four-inch disc of cardboard laid on the green. It is reported in *Forest and Stream* for November 30th, 1912.

So far as I know this game was the first in America but I am quite willing to acknowledge the priority of anyone else who may present a better claim.

Now what are the larger aspects of the question which we archers should face with candor and attempt to solve? Is it of sufficient merit to take a permanent place in the program of golf clubs? Does it show the beauties of archery to such a degree that it may entice some of the great horde of golfers away to what we think is a better game than theirs, acting as a sort of stepping stone to real archery?

As a parliamentarian might express it, the answer to both interrogations is in the negative, and the reason is simply that archery is at its best only when it follows one of the forms which have become conventionalized through a long process of selective evolution.

In the first place an initial flight shot has none of the difficulties of the drive. While it is true that every archer loves to pull a powerful bow and to see his shaft wing its giant parabola yet his interest wanes from a continual repetition of the act when there is no reason for taking careful aim. The golfer may hit the ground or fan the air, he may top his ball or slice it, hit a bunker, fall in the rough or do almost anything but what he wishes but with the archer it is all a certainty. For a five-hundred yard hole just two long flights and one or two little ones at the end and he is always sure of a three or a four.

I feel that on October 14th, 1923, the problem was put to a test which I believe can be accepted as authoritative. On that day W. H. Palmer, Jr., national champion at the time, and I played over the course of the Westchester-Biltmore Club of Rye, New York, against two of the best professionals in this country; one was Cuthbert Butchart, of the club, who held the record of sixty-eight for the long course and the other was the

famous Johnnie Farrell. We played best ball and won two holes each way, ending four up and three to play. The out-score was: Golfers 36, Archers 34. Now I admit that this looks very close but the facts are that while the golfers were playing their own game, and performing superbly all the way, Palmer and I were on strange links and playing at a make-shift which we had never practiced and which we both honestly know could have been done much better. While we have both been well used to the targets neither has ever shot seriously at a small object at random distances like the polo ball which was used as our mark. Time and again we would be near the green in two, always on it in at least three, but then would miss a shot or two at the ball. An archer trained in shooting squirrels would make the best golfer look foolish. The essential unfairness of the game lies in the fact that the golfer must use exactly the right degree of force in his putt while the archer may make his final shot as strong as he likes. An approach to equality may be obtained if both sides aim at the same mark, such as a four-inch ball split in half.

Of course, while our country contains thousands of golf courses and but a few regularly laid out roving ranges, many archers who wish to shoot in the roving style will have to make a virtue of necessity and play archery-golf or nothing, unless they rove the unmarked fields.

Yet such unspoiled terrain may yield a heartening relief from formality. For instance, the largest roving parties in America take place yearly near the ancient village of Avondale, between Philadelphia and Wilmington, so long settled that the hospitable door of the home of one of our hosts is still opened by a latch string. The fields thereabout are like those of England, in their rolling beauty, and every autumn a day is set when scores of happy archers rove over them in a course that leads for miles. The marks are upturned peach baskets, with thin sides that cannot injure a successful shaft, placed far apart in spots of vantage. Afterward there is a

feast whose foundation is a pig roasted whole in the open air, washed down with unlimited cider.

Then, again, the revived United Bowmen of Philadelphia, some of whom plodded for years through week-ends of golf, have discovered that the arrow is quite as fascinating and tantalizing as the rubber ball and that the varied acres of their suburban estates can give them more leisured fun than they can find on crowded golf grounds.

In old England that sort of archery must have existed wherever men owned bows but, quite naturally, it has left no monument of written word. Such records as have come down to us are of the associates who shot over the regularly marked fields about the city of London.

The mode of shooting on all of those fields seems to have been reduced to a recognized standard, but the only set of rules for roving that I have knowledge of is for the Archers of St. George's. Aside from obvious requirements, they specify: two arrows at each mark, the mark to be within everybody's reach, a hit in another mark not to count, an arrow dropped by mishap to be shot only if reached by the bow, the winner of a mark to name the next one, and seven to be the game.

Fortunately, we can visualize the exact layout of the Finsbury Fields from an ancient map which is reproduced in the *Gentleman's Magazine* for 1832, of which I have a copy, and it is justifiable to suppose that the other fields were arranged in the same manner. It was taken from a pocket guide book, or *aim*, only four inches high, which was published in 1628 as a reproduction of one of 1594. At first glance it answers a question which has always puzzled me: How could so many miles of highly valuable land be given over to the playing of a game? The reason was that the marks were placed in the hedges and, presumably, were used when the fields were either harvested or lying fallow or, in courtesy, the archers walked to them by paths around the edge.





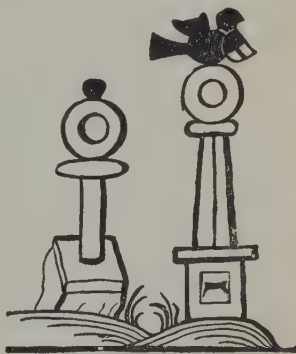
### ROVING IN "THE SPITEL FYELD"

From wood block map of London by Radulph Agas, 1591. City wall with "Aldre gate" is shown



The marks were called *stakes* and, for the most part, were ornamented wooden posts stuck in the ground, though some of the more pretentious were mounted in a base of stone and a few, which must have often penalized a successful shot with a broken arrow, were all of stone. On the map of 1628 they numbered 164 but as they rotted down they were replaced by others or cleared away until in 1737 only 21 remained, of which but six bore names that had appeared on the earlier list.

In the library of S. G. McMeen, of Pasadena, is a copy of a very rare book on archery by Gervase Markham, published in 1664, which is purely, or impurely, a plagiarism of Ascham but which is interesting because of its frontispiece of an archer shooting at rovers, who may be either Charles II, to whom the book is dedicated, or Gervase in his best clothes, as the reader prefer. In the background are two stakes. Each is a pillar set in a large base, probably of stone, surmounted by a round object which looks like a ring, or possibly a target, and crowned above all with a piece which distinguishes it and, no doubt, indicates its name; on the one a ball, on the other a flying bird.



Stakes or Rovers.

While our map shows differences in some of the stakes, as *Sea Grifphon* capped by a monstrous fowl, most of them are merely diagrammatic. For example, *Queenes Stake* is without adornment while in reality, by analogy with similar stakes in other fields, it was probably quite elaborate. On September 7th, 1583, a Queens Majesties Stake was set up in Holborn Fields, west of Finsbury, which provided an occasion for a celebration by the whole parish of St. Clements. At another

time a Queens Majesties Stake, accompanied by a great parade, was placed in St. James Fields, now the park of that name, which was described thus: "Then came a very sumptuous Stake, being the Queens Majesties; upon this Stake



Base of Stake.

stood a golden Lion holding a Shield with her Majesties Arms, the supporters whereof were *Fortitude, Justice, Temperance* and *Prudence*, the Lion having a whole Crown on his head."

The Queens Stake at Holborn was presented by "Stakemaster Knevit, one of the gentlemen of her Majesties Chamber, at his cost and Charges," in 1583. The charter of the Fraternity of St. George, whose fields seem to have been nearly the same or a little to the west, was granted to others and "Anthony Knevett of oure prevy Chambré," in 1538. If the same Knevett were 45 years in service he would seem to have had the oversight of archery as one of his minor duties and to have borne the title of Stakemaster. That word did not appear in any of the dictionaries until I wrote the definitions for Webster's, where I felt justified to place it.

The names of the stakes were whimsies of their donors but sometimes their origins can be guessed, as: *Jehu*—"Jehu drew his bow with his full strength" (II Kings 9: 24); *Old Absoly*—"Absalom in his lifetime had taken and reared up for himself a pillar . . . and he called the pillar after his own name" (II Samuel 18: 18).

The shooting was directed across the fields at great distances, never along the hedges. As each new mark was a matter of choice, there was no set course to follow, as in golf, but the archers might criss-cross about at will. Since few men could remember the name of every stake with its

length, the little *aims* must have come in very handy, especially on strange grounds.

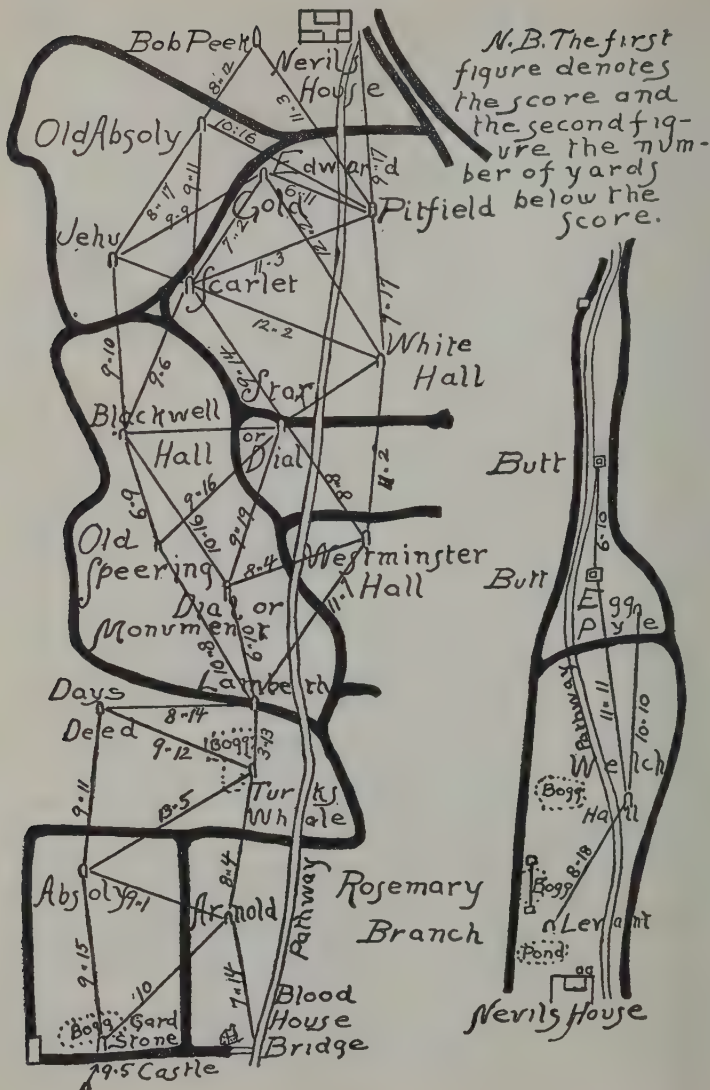
In the list of lengths appended to the map the shortest is 9 score and the longest 19, though another *aim* gave a "dimensuration" of 21. Perhaps those marks at such immense ranges, especially the stone ones, may have been for the use of crossbowmen, for instance at Hyde Park, in 1661, "Several of the Archers Shot near Twenty score yards within the compass of a Hat with their Crossbows and, to the amazement of the Spectators, hit the Mark." Formerly, a flight of 420 yards with a yew longbow would have seemed fanciful, but now that so many American archers have shot further it is no longer so.

This, I think, is the highest form of roving, developed from centuries of experience, and I should like to see it played on American ranges. Especially would I condemn the bastard monstrosity, sired of golf, which requires the mark to be hit in the least number of shots, each delivered from where the last arrow fell.

In roving it is well to use the strongest bow that one can command. Ordinary target arrows are suitable in fields that are free from stones and against soft marks, but for very long shots a few flight arrows should be carried and at random marks, or on stony ground, stout shafts of hickory or birch are best. They should be painted in brilliant colors.

Although the old Finsbury marks of wood and stone were characteristically British in their solid and permanent construction they undoubtedly must have been very hard on the arrows. For modern use I would suggest either a small butt of sod, two feet square and three feet high, or, which I think is better, a rod, thickly lashed about with straw and covered with canvas.

An amusing pastime for use near hotels or clubs, especially in wooded country, consists in setting up representations of



Finsbury Rovers in 1737.—*Archæologia*, Vol. VII.



animals at strategic points, to be shot at from designated stands as though they were real.

### CLOUT SHOOTING

Shooting at the clout was the old English form of competitive archery at a single mark. It was played like rovers except that the archers did not move on from one mark to another but shot repeatedly at the same object as we do in target shooting. It gets its name from the fact that a white rag tied to a stick or stretched on a frame was the early form of objective. From target shooting it differs essentially in the great length of the ranges, which are never less than nine score and may even be as great as twelve score, a distance which would have won many of the flight shooting contests in our American tournaments.

For at least a century and at the present time there have been only two archery societies in Great Britain which have shot in this way: the Royal Company of Archers and the Woodmen of Arden.

The Royal Company shoot at either nine or ten score at a clout three feet in diameter; a white straw target without rings but with a black spot in the centre. To be in the marking an arrow must strike within four bows, or twenty-four feet, of the clout-pin. Of these the only ones that count are those hitting the clout, no matter how many there be, which score two points, and the arrow nearest to the clout but not in it, which counts one. Thus if no arrows hit the clout, as is very often the case, the only score will be a one for the man whose shaft is nearest.

On practice days, however, they shoot at the "rings," as they call it. In this form of the game rings are marked on the grass around the clout at distances of half-bow, bow, bow and a half and two bows, or three, six, nine and twelve feet, the whole thing thus becoming a twenty-four-foot target with the

clout as a bull's-eye. The scoring is the same as on the Scottish four-foot target: 5, 4, 3, 2, 1.

The number of ends, of two arrows each, at clout shooting, is not definitely fixed in Scotland but is determined at each match by two judges of the day who usually set from seven to ten.

There is a flavor of times long past in the matches and ceremonies of this ancient company, as there is in most Scottish formalities, for the strongest races are the most sentimental. What can depict the charm of clout shooting in Scotland more convincingly than such reports as these?

"The Royal Company went down to Selkirk, in Ettrickdale, this year (1925) to shoot for the Selkirk Silver Arrow. The name on the oldest medal attached to the arrow, bearing date 1660, is Walter Scott, of Godelands. They received, as ever, a warm welcome from the Provost and Magistrates and Townsfolk of the ancient burgh and marched through the town to the deer park in the Hainine preceded by their Pipe Band, who wear the kilt of the Royal Stewart tartan, and the two Town Halberdiers, one carrying the Silver Arrow tied to his halberd. Before many spectators ten ends were shot, resulting in a tie. In the evening a dinner was presided over by Lord Armidale at which the arrow was presented to the winner by the Provost of Selkirk, accompanied by the usual and ancient custom of a 'riddle' of claret, which was duly honored."

"Shooting for the King's Prize, which is Twenty Pounds, presented annually by His Majesty to the Royal Company, for the winner to buy a piece of silver to commemorate his success, instituted in 1787 and first shot for in 1788, took place at the Archery Range, The Meadows, Edinburgh, on 9th July, the distance also being nine score yards. The day was ideal for shooting in every respect, and the contest was witnessed by a large number of spectators. Brigadier Sir Thomas Hutchinson, Bart., won with a score of 3, made by having the nearest arrows in as many ends.



CHAPMAN AND PHILIPS CLOUT-SHOOTING IN THE SNOW  
WOODMEN OF ARDEN CLOUT-SHOOTING AT THE RINGS



“On the previous day the monthly match and dinner were held at Archers’ Hall, the custom being that sides should be drawn and, after the match, one of the losers has the honor of presiding while the highest scorer on the winning side gains a ‘free’ dinner. The shooting is at nine score yards and at the ‘rings.’ Five ends constitute a ‘party’ and there were three ‘parties’ shot. The winner made 11 hits out of 30 arrows, with a score of 25.” (Editor’s note: In English target values this would have been 39.)

The clout used by the Woodmen of Arden is two feet six inches in diameter. For the first century of their existence they shot under the ancient rule of acclaiming the arrow nearest the clout, or nearest the centre of the clout if two or more were in it, as that of the winner. In 1887 a series of triennial matches at clout shooting was begun between the Woodmen and the Royal Archers, the latter presenting a handsome silver bowl for a prize. To establish fresh conditions for this match the Woodmen decided to shoot at numbered rings drawn around the clout but they were of different width and number from those of the R. C. A. The clout is encircled at distances of 18 inches, 3, 6, 9 and 12 feet and the values are 6, 5, 4, 3, 2, 1.

Exactly one hundred years before the gift of the bowl, in 1787, Heneage Finch, Lord Aylesford, presented a massive silver bugle which was to be shot for at not less than 9 score nor more than 12 score, the distance to be determined by lot. This competition still goes on at any of these great distances that may happen to befall. A year later the Countess gave a silver arrow, which with true feminine compassion she stipulated should be competed for at the least range of only 9 score. This also is an annual event. The number of arrows at each round varies from year to year, which seems peculiar in modern days.

Practically all of the chief features of the shooting at Meriden and Edinbrough are the same except in regard to the size

of the targets. At both places double clouts, or clouts at each end of the range, are used, and both have markers, or men who stand behind shields near the clouts and signal the result of each shot. Each marker has a little white flag on a short stick. For over-arrows he waves backward, for short, points to the ground in front and extends his arms for wide. For hits in the rings he gives as many flaps as the number warrants and for a clout he falls over on his back.

At the competitions between these two societies there are about ten or a dozen men on a side. There were four matches, from 1878 to 1887, of which the Scotch won the first three and the English the last. The regular triennial series has continued till the present time except for the interruption of the war. The match shot in 1932 was the seventeenth and the tally now stands nine for the Royal Company and eight for the Woodmen.

In America the first clout shooting was held at Cooperstown in 1922. James Duff, who had been a marker for the Royal Company for eight years in his youth, laid out a 40-foot ring for us, but we used a regular four-foot target for the clout. Why we used 40 instead of 48 I do not know. Our scoring was different from any in Great Britain, as we counted three for a hit in the clout, two for the nearest arrow and one for every other arrow within the ring. I was the lucky man that year with a score of 36, including three clouts. I remember that it was blowing a regular gale so that one had to aim what seemed to be thirty or more feet to the left of the target to allow the arrows to drift on. It was nearly all luck with me. The clout was at 180 yards and I found that my bow at its full draw and forty-five degrees would shoot exactly that far. All I had to think of was direction and distance took care of itself. The women shot at the same target but at 120 yards.

In 1923 the same kind of clout shooting was put on the program of the Eastern Archery Association at Jersey City. Miss Katherine Howe, of Dorset, Vt., won with a score of 39



for the 36 arrows. I notice on looking over the old scores that I was twentieth out of twenty-six contestants.

In the National Archery Association at Chicago, a month later, W. H. Palmer won with the fine score of 41.

In 1924 the men and women contested separately, for the first time, at the E. A. A. tournament at Rye. Miss Dorothy Smith won for the ladies and I was lucky again among the men for the same reason as before, that the bow, although another one, shot exactly that far. The next week, at the N. A. A. at Deerfield, the same bow carried only 170 yards, draw and loose as I would. Palmer won again, making 40.

All this time the same 40-foot ring and four-foot target had been used, and it was rapidly becoming accepted as fact that the true American Clout Shoot was of that description. Next year (1925), at the E. A. A., it was thought that a change to counting by the rings might be introduced with advantage. The foreign methods were studied with care but were not considered satisfactory, chiefly for the reason that an arrow just skimming the top of the clout would not land in the next ring but would go over into the second one.

We therefore devised a target of which the gold was formed by a standard four-foot target laid flat on the ground, the red was four feet wide and the blue, black and white were each six feet, the whole thing being forty-eight feet in diameter. To mark the clout distinctly a small white flag, like the old original clout, was stuck in the centre. The men shot at 180 and the women at 120 as usual, but this time each sex had its own target. The rings were made with white tape, such as is used for marking tennis courts, wired down by broad staples placed about a foot apart. It proved to be very satisfactory and permitted of no disputes, such as might arise from the irregularities of marking with lime.

Seventy-two arrows were shot; the first three scores for each sex being:

Miss E. True..... 63-279  
 Miss D. Smith..... 61-251  
 Mrs. B. P. Gray... 56-228

Dr. Crouch..... 64-282  
 J. Barrow..... 60-230  
 W. H. Palmer, Jr.. 59-227

It thus appears that scoring at this distance is much easier than at the 100 yards of the York on the small target. Perhaps it may be properly compared to the 80 yards.

With these changes in mind the target at the national tournament at Rome was simply a reconstruction of the regular standard target except that the unit of measurement was the foot instead of the inch. Thus we had a forty-eight foot target with a gold of nine and six-tenths feet and rings of four and four-tenths feet. Thirty-six arrows were shot, Dr. Crouch starting the new series of records with perfect hits, 36-172. The next year rain prevented the event and in 1927, as standards were not yet agreed upon, forty-eight arrows were assigned, Crouch making 48-348 and Dorothy Cummings 48-322. Most likely such a double perfect of ninety-six hits for the two winners will never be made again, as thenceforth three dozen was set permanently for the number of arrows. Since, at different times, the bull's-eye had been marked indifferently with a target, a clout or both, the constitution of 1931 brought uniformity by specifying that it should be marked only by the straw bass of a standard target laid flat on the ground. The face must be underneath and no flags or poles or other markings allowed. Very pleasingly, this first match under such conditions was won by father and daughter, Carl and Helen Thompson. So far, the N. A. A. record for men is also held by Thompson who, getting 36-262 in 1930, just nosed out Hoogerhyde with 36-258. For women, Mrs. Elizabeth Rounsevelle made 36-228 in 1929.

In my opinion the distances of 180 yards for men and 120 for women are not relatively just. The great majority of men's arrows do not reach so far as the clout, as it is beyond the range of target bows of moderate strength, whereas every woman can shoot well over 120 yards. A distance of 140

yards for women would more nearly equalize the difficulty of performance.

The technique of clout shooting is essentially different from that for distances of 100 yards or less, because the elevation of the bow is usually either at 45 degrees, where the maximum distance is to be obtained, or not very far below it. Overhand shooting, therefore, necessarily implies either a very low draw to the breast or a point of aim high in the sky. As most archers, at least in America, indulge in clout shooting only as a secondary amusement and do not wish to spoil their form for target shooting by drawing in two different ways, they are averse to the breast draw and by necessity are forced to take the high aim.

An aim in the sky, however, is the most uncertain thing in archery. If it be a cloudless day one is left with nothing to fix his vision on and must rely wholly on his judgment, the ancient style of shooting which never brings good scoring, and even if clouds be in the sky they are always on the move and are extremely deceptive.

To avoid these difficulties the English have shot with an underhand aim for time out of mind, as is implied by the very use of the words *forehand* and *underhand* in the older writings. By this method one sights at the clout, or point of aim, from below his bow-hand, usually by aligning with some mark on the lower limb of his bow. Although I am opposed to the use of artificial aids in archery I feel that if they are ever justified it is in clout shooting. If one put a band of rubber, or a piece of adhesive plaster, or a piece of marked paper at the right place on the lower limb of his bow he can sight it in line with the horizon, or the clout as he may prefer, and thus obtain a very consistent elevation. In fact I think it is the only accurate method of clout shooting.

This form of archery has distinct charms of its own. It allows a freedom of action that is not nearly so exacting as the finished technique of close work at the targets, although I do

not mean to imply by that that one should be careless of details if he wish to excel at nine score or over. Unquestionably it is one of the most beautiful kinds of shooting, with its great sweeping trajectories which seem to cut the clouds. It is the blood brother of roving, except that it allows of greater accuracy because of continually repeated shots at the same mark.

There can be no question but that clout shooting is a highly desirable variety of shooting, with a legitimate place of its own. It is especially suited for men of æsthetic appreciation, who enjoy the long flights and long walks and who are lucky enough to have at least a narrow range of 200 yards at hand, even though they may not have a field large enough for rovers nor care to keep so large a space of ground in condition.

### FLIGHT SHOOTING

The whole object of flight shooting is to send an arrow the greatest possible distance without particular regard to direction. Undoubtedly the longest flight shot of which there remains a record so authentic that it can be accepted without a quibble was that of the Persian archer named Aresh, who stood on top of the mountain Damovend and, just as the sun peeped over the horizon, loosed a shaft with such splendid vigor that it did not strike the earth until sunset, when it landed in the banks of the river Gihon about five hundred miles away.

With such an example set before us what can we do to emulate it?

There is so much fable mixed with fact in all the ancient accounts of shooting for distance that we cannot be very sure of what the real performances of the ancients may have been. Of one thing we are certain; that the bow with by far the best cast is the Oriental composite bow which is described in the next chapter. The first shot, of which we have undoubted proof, that was made with such a weapon was that of Mah-

moud Effendi, the best report of which is given in a footnote to page ten of Roberts' *English Bowman*, as follows:

"In the year 1795, Mamhood Effendij, secretary to the Turkish Ambassador, a man possessing very great muscular power, shot an arrow with a Turkish bow four hundred and eighty-two yards in the presence of three gentlemen, members of the Toxophilite Society, now living; who measured the distance, and to whom he observed that the present emperor (Sultan Selim) could shoot further than any one of his subjects."

This statement I absolutely believe. The bow and arrow with which he did it have been in the possession of the Royal Toxophilite Society ever since and the present record is so near to it as to put the feat well within the bounds of credibility.

There are many other shots which we may accept with caution. For example Stuart (*Antiquities of Athens*, Vol. I, p. 10) mentions a shot by Hassan Aga, the waiwoode of Athens, of 584 yards and one foot, English measure.

I know of nothing that will help us to distinguish between truth and fiction in these old reports except our own good sense, as sometimes the authors of the most astounding tales appear to be men above reproach. For example Sir Robert Ainslie, English Ambassador to Turkey, said that in 1798 he saw this same Sultan Selim shoot 1400 pikes (Turkish measure) which he translated as 972 yards  $2\frac{3}{4}$  inches.

During the whole of the nineteenth century there was not very much flight shooting done in England of which any record has been published, with either English or Oriental bows, and the great shot of Mahmoud began to take the form of a questionable myth. In 1905 the celebrated sportsman and authority on firearms, Sir Ralph Payne-Gallwey, appeared in competition at Le Touquet with a Turkish bow and made a flight shot of 367 yards. James Duff told me that he had seen Sir Ralph shoot 376 yards in Edinburgh, in 1905, with this



same bow, which drew 100 pounds, and that an arrow from it had pierced the steel marker's shield behind which Duff was standing, at 200 yards. I mention this particularly to refute the absurd statement, often made, that while the Turkish bow will shoot far it will not shoot with great striking power.

Even though this record at Le Touquet exceeded by 7 yards the best distance then claimed for a bow of yew it was destined to be beaten eight years later by Ingo Simon.

In June, 1913, he startled the archery world with a shot of 459 yards 8 inches but in the next year, June 26th, 1914, he not only equalled but measurably improved it. *The Archers' Register* reports as follows:

"In the afternoon flight and rover shooting took place on the golf links. Mr. Ingo Simon beat his former long shot by 3 yards, and shot a distance of 462 yards 9 inches. He used one of his Turkish bows, pulling 80 pounds, and Turkish flight arrows, and drew the string by placing it behind an ivory ring, which he wore on his thumb, and tucked his thumb under his first finger."

Until 1932 this shot was often called the world's record, though I feel that it did not deserve that distinction without qualifying it by mentioning the apparently undisputed shot of Mahmoud. There is also no doubt that arrows have even been shot much farther than that of the Turk, as he did not seem to think he had performed a very remarkable feat. How unfortunate it is that with the passing of archery in the East we cannot look forward to having some accurate modern measurements of just what those best shots were!

Both Sir Ralph and Mr. Simon were men of great personal strength. The latter is not a native born Englishman, although he has lived there for many years. They both used short arrows, about twenty-one inches long, which they drew for four or five inches more by means of a bone guide fastened to the bow-hand.

The cast of the best old English bows is difficult to estimate.



Four centuries of experience, more or less, lay behind both bowmen and bowyers, for all of which time they were acknowledged to be the best in Europe. Now that the modern record for the bow of yew is being pushed forward in the last lap toward the goal of five hundred yards, we are no longer justified in assuming that the best of the ancient feats were of much lower merit. The Finsburie Ayme of 1628 gives nineteen score yards as the greatest length between any two marks, a distance which would have seemed incredible to us some years ago but which is now well within belief. John Smythe's marginal note on page 15 of his *Certen Discourses* (sometimes he spelled it *Certain*) is the only specification of range which is in any sense contemporary with military archery, although at that date of 1590 it was certainly decadent. The quotation is important enough to be given in full, as follows:

“If Mosquettiers may giue effectuall volees 24. scores of (as it is fondlie reported) then some number of Archers being chosen, that could with their flights shoote 24. or 20 scores (as there be manie that can) may by the same reason giue volees of flights at their enemies 18. scores of, which both the one and the other are mockeries to bee thought of, because there is no weapon in the field effectuall, further than to a conuenient and certen distance.”

After all, this maximum of 480 yards is ten less than the best modern practice shot.

The old laws forbade practicing at any marks that were less than 220 yards away, which meant with ordinary arrows, flight arrows evidently being reserved for much greater distances.

A famous passage in Shakespeare's *Henry IV, Second Part*, has puzzled every commentator and is not satisfactorily explained even in the great *Oxford New English Dictionary*. It runs like this:

"*Shallow*—Death is certain. Is old Double of your town living yet?"

*Silence*—Dead, Sir!

*Shallow*—Dead! See! See!—He shot a fine shoot!—John of Gaunt loved him well, and betted much money on his head. Dead! He would have clapped i' the clout at twelve score, and carried you a forehand shaft a fourteen and a fourteen and a half, that it would have done a man's heart good to see. How a score of ewes now?"

Critics and lexicons have both gone on the wrong track by saying that while the exact meaning of "forehand shaft" is unknown, it probably referred to a light form of arrow used for flight shooting. This is a mistake. The only question is whether it might possibly have meant an arrow shot with the bow-hand higher than the archer's head, as stated in the *Gentleman's Magazine* for 1832 by the antiquarian A. J. Kempe, or whether it meant an arrow that was sighted above the hand as in near shooting. If the former interpretation be accepted, the passage would indicate that in Shakespeare's time the extreme limit of a flight shot was 290 yards, the exact figure, in fact, which stood as the American record for thirty-three years. However, I incline to the latter view and believe that Shakespeare's true meaning was that old Double was such a strong archer that he could shoot that far without having to raise his hand higher than would still permit a view of the mark. This would imply a much longer flight if the shaft were shot underhand.

It is natural for us to be incredulous of all athletic records that were made in the eighteenth century, as so many of them were carelessly measured or even deliberately falsified, but the following statements of Roberts, in his *English Bowman*, are undoubtedly authentic.

"Mr. James Rawson (of Cheetham Hill, near Manchester, who died about the year 1794, the best archer of his day) told Mr. Waring that he once shot upon ground, very little de-

clining in his favor, eighteen score yards (360). And in the year 1798 Mr. Troward (a member of the Toxophilite Society) shot on Moulsey Hurst, an uncommon level piece of ground, and when the wind was very still, seventeen score yards (340). It is not believed that, for at least a century or two past, these two instances of distance shooting have been surpassed.

“The shot made by Mr. Troward was not an accidental shot; he repeatedly shot, both up and down the wind, that distance, the same day, in the presence of many members of the Toxophilite Society. As his shots were made during the contest for a prize, each shot was measured with the greatest possible accuracy and the field had been previously staked out in scores and half-scores. Mr. Troward shot with a self-bow, of the power of sixty-three pounds. His arrows were flight arrows, of the length of twenty-nine inches, and weighing about four shillings, arrow-weight. The bow with which Mr. Rawson shot was a backed-bow.”

Roberts goes on to describe Rawson as a very stout, middle-sized man who was a maker of men's shoes. “In the exercise of that business he increased the force and hardened the muscles of his arms to such a degree that his power over the bow was exceedingly great.”

Of flight shooting in Great Britain between this time and that of Ford I know nothing except for the interesting remarks which Ford himself makes concerning Peter Muir, the famous bowyer of Edinburgh. He says that although Muir was a man of great skill and strength he found that he could shoot further with a bow of from fifty-eight to sixty-two pounds than with a stronger one, but that, with such a bow, he never could quite reach 300 yards.

Ford himself passed that mark and as everything of his best that he said and did should be known by all students of archery I will quote the paragraph as he wrote it:

“In flight shooting, I have, personally, had very little ex-

perience, but in the autumn of 1856, in the presence of a brother Archer, I succeeded, upon several occasions, in exceeding the 300 yards, the longest shots being 308 yards, with a slight wind in my favor, and in a perfect calm 307 yards one foot; the ground was carefully measured with the tape. The bow used was a sixty-eight-pound self yew, taken at random from Mr. Buchanan's stock, and was by no means remarkable for quickness of cast, though it has since proved an excellent target bow. I believe, therefore, that with practice, 300 yards is fairly attainable by many Archers of the present day, and that several might even reach very considerably beyond it."

It seems to me that these English archers did not give enough heed to the arrow in flight shooting but that they appeared to think the differences in the distances which they obtained were due solely to the power and cast of the bow. I cannot help feeling that if Ford had shot a flight arrow of the kind which we use to-day he might have made a better record than even 308.

After the time of Ford I think that flight shooting was almost non-existent until it was revived by Sir R. Payne-Gallwey.

Flight shooting in America owes its firm tradition almost entirely to L. W. Maxson, who won the event in the annual tournament of the N. A. A. fourteen times. Although he won it for the first time in 1887, eight years after the first tournament, there had been only three contests before that and I have an impression that Maxson was in at least two of them. I think I have said elsewhere that Maxson was a big man of unusual strength, a former oarsman at Yale, and it evidently was a delight to him to exert his powers in a strong bow. His best record of 290 yards, made in 1891, remained unbroken until 1924, although G. P. Bryant came within eight inches of it in 1916.

To my mind there is no question but that every one of the N. A. A. flight shoot records from 1882 to 1909 is wrong.

It is a self-evident fact for, if you look at the list closely, you will see that every length is expressed in even yards except two which have half a yard added. This is so absolutely impossible that one wonders if sometimes the distances were not even paced off, or measured in some such careless manner. In 1910 the event was won by Mr. Homer Bishop, who is a man of extraordinary mechanical exactitude, and for the first time inches were included in the measurement. Since then I am sure there have been no mistakes of any magnitude. It was even worse with the old English measure by the score. It is impossible to tell within sixty feet just what they meant.

I won the flight shoot in 1910, making 270 yards nine inches, with a six-foot lancewood bow from Aldred's, of London, which I think weighed about fifty-three pounds. The arrow was an ordinary target arrow from my regular set by Whitman which was numbered thirteen and, perhaps for that reason, always flew too high at target shooting. Fred LaPorte, of Kansas City, had told me the evening before that flight arrows had small feathers so I cut mine down to mere nubbins. When I came home I put that arrow away in a safe place so that I would be sure to have it next year and I have never been able to find it since.

There was a howling wind blowing and I shot very high to catch it. I also used a six-inch bone guide, which I wired to the bow, so that the total draw must have been about thirty-two inches. Just how much the bow weighed at this distance I do not know.

In 1913 I won with 260 yards, using the sixty-pound osage orange bow by Mauser that I have described in the chapter on Tackle. I shot a light target arrow with trimmed feathers, drawn in the bone guide.

In 1922 I used the wonderful little five-foot bow of Paraguay ironwood which Pope had made and with which he had won the year before. Through an oversight Pope's distance is not recorded in the books of the N. A. A. but my recollection

tion is that it was just ten yards better than mine in 1922 which was 269 yards. We both used the same flight arrows, beautiful light shafts of bamboo, thirty inches long, footed with birch and tipped with a bullet casing.

How puny those distances seem in retrospect, even though they represent the general average for forty-five years! Yet they were the full cast of good bows of English pattern and appeared to us to be satisfactory. They bear much the same relation to the majestic trajectories of to-day as the five hundred American of that time does to the seven hundred of the present.

In 1923 Prof. Charles D. Curtis appeared in a tournament for the first time and won the flight shoot with the good distance of 273 yards thirty-two and one-half inches. Professor Curtis was born in Iowa and near his home in the days of his childhood was a tribe of Sac and Fox Indians. One of their chieftains taught him how to shoot a strong bow by resting it against the feet while lying on the back.

Although the professor shot in the regular way at Chicago it occurred to him on returning home to use a stronger bow against the feet and thereby determine whether an arrow could be driven much over 300 yards. At present he is superintendent of the city schools of Pembina, North Dakota, a town just across the border from Canada which lies in an absolutely flat plain of vast extent, just the sort of surroundings to suggest flight shooting.

If Curtis had used a bow of enormous strength against his feet the aspects of the case would have been different, but, in fact, he used a bow of only seventy-five pounds which many men could easily shoot by hand. He himself could not draw a very heavy bow because of an injured elbow.

For the first time in a century and a quarter, or since the days of Rawson and Troward, he proved somewhat of the real cast of a good bow by a series of shots of which the best two were practically the same, 341 yards 27 inches in Novem-





CURTIS—FLIGHT SHOOTING AT ROME, 1925  
CLOUT-SHOOTING AT ROME, 1925



ber, 1923, and 341 yards 10 inches in April, 1924. His arrows were thirty and thirty-one inch bamboo (the natural reed) and his bow was a five foot three inch osage orange weighing seventy-five pounds at twenty-eight inch draw.

When Professor Curtis decided to make the 2,000 mile journey to attend the tournament at Deerfield in 1924 he wrote to President Taylor asking if it would be in accordance with the rules of flight shooting if he used what other writers have called the pedominal method. Before answering the question a circular was sent to all the members of the Executive Committee asking for an expression of opinion. It was unanimously agreed that inasmuch as the constitution contained no directions to the contrary an archer might shoot in any manner he chose provided that he used no drawing force but that of his own bodily power.

All the archers watched with intense interest when the time came for him to shoot. He spread a little mat on the ground, sat on it, fastened the bow to his feet by a pair of straps passed through leather loops, very much like a shawl strap, held the string with both hands, straightened out his legs at forty-five degrees and away flew the shaft for 304 yards six and one-half inches. I believe he had previously broken the bow which shot 341 yards.

The constitution provides that the winner of the shoot may try three extra arrows in an attempt to better his distance. While Curtis was shooting these one went somewhat out of line, and, as I have said in the chapter on Tournaments, came, unobserved, over the roof of the academy and struck the back of the arm of Joseph G. Stevens, Jr., the son of the president of a bank in Greenfield near by, thus giving him the distinction of being one of the few living Americans who have been shot with the full force of an arrow driven from a heavy bow. I speak of it at length because of the rarity of such incidents and because it gives some insight into the probable effect of arrows at the longest ranges in ancient warfare.

In writing from Africa of their hunting Dr. Pope says that an arrow carries death to the end of its course and Mr. White says that it will kill a buck even at extreme range. No one can doubt that these great hunters knew exactly what they were talking about and yet one wonders if to get such lethal results it be not necessary to use very heavy hunting arrows which would have great momentum. I raise the question because I saw Curtis's arrow hit the bare arm of Joe Stevens, a boy of about thirteen. It was shot in the strongest manner possible, it was tipped with a sharp bullet jacket and yet it penetrated little, if any, more than an inch. I pulled the arrow out of the wound myself and know whereof I speak. I presume that a sharp-edged broadhead would have done much greater damage.

While practicing on the evening before the flight shoot, Dr. Crouch shot an arrow 306 yards. Though this was not official yet it was possibly the first time that such a distance had been attained in America by shooting in the usual style. However, we must not discard a statement made by Dr. Weston shortly before his death, that he had seen his friend Frank Canfield shoot more than 300 yards both up and down wind.

At the Sesqui tournament of 1926, Curtis used a short osage bow that he had made only two days before and, shooting but once because of darkness, raised the free style record to 324-24. With the same equipment in the following spring, proving the value of reseasoning a finished bow, he reached 366-23, the shot being made at an agricultural exhibition and accurately measured. On September 22nd, 1928, in practice but with other men handling the tape, he made four shots of over four hundred yards of which the best was 422-24. This is the longest cast by foot and hand that has been measured.

1927 saw the beginning of another great phase of archery for distance only, when Dr. George A. Cathey of Portland, Oregon, appeared as the first of the brilliant galaxy of shooting stars who were to shine in the northwest. At the cham-

pionship tournament of the new Pacific Northwest A. A. he passed the three hundred mark with fourteen inches to spare, it being the first time that the feat was accomplished by shooting in regular style at a recognized meeting.

By 1928, flight shooting had become a matter of nationwide interest. Fetching the palm from one corner of our country to another, Howard Hill of Miami, Florida, shot the amazing distance of 391-23, the measurement being taken by four men of whom one was the veteran archer Richard Ashby, formerly of Leamington, England, and another was Glenn H. Curtis, the pioneer aviator. Mr. Hill is a superbly built young college graduate who boasts of descent, in part, from the Cherokee Indians. When I saw him at the national tournament, later in the year, his longish black hair was bound about with a fillet of bright beadwork, in pride of race. His musculature is feline in its flexible force. He is as lithe as a jaguar and as strong. Such tackle as his has no other man used. The five foot bow of osage orange actually weighed 172 pounds for a 22 inch draw, the arrow being of stiff birch. What would have been the thoughts of Will Thompson who said, even though referring to steady work at the target, that no man could properly control a bow of more than sixty pounds? I shall never forget my feeling of helplessness in holding that bow, whose string I could scarcely stir. At the N. A. A. tournament Hill got only 308-25½, which was a disappointment even though a record.

Other tournaments of 1928 yielded marks that were wonderfully in advance of those of previous years. At the Southern California A. A., Fred Kasmer shot 305-4, at the Denver A. A., C. Harold Scott 305-18, at the Midwestern A. A., H. A. Hutchinson of Montana 331-11, a cast that I saw myself, and at the Pacific Northwest A. A., Cathey increased his record to 366-4.

In 1929 the ladies of the northwest became interested and because of both their personal strength and the skill of their

husbands in bowery they immediately set a high standard. The best three were Mrs. Homer Prouty 292, Mrs. Harry D. Hobson 271 and Mrs. L. L. Daily 266.

A pleasant surprise for us humble easterners who dwell so far from the land of yew was a 332 shot by E. L. Davis of the Potomac Archers. It was made with a sixty-nine inch bow of black locust of 120 pounds weight, proving that another eastern wood beside osage has possibilities.

Speaking of different materials, Arthur Knight, Jr., shot about 320 yards unofficially in this year with an eighty-five pound bow of steel, his father, a civil engineer, pacing it off.

In 1930 the marks moved into the fifth century and, as usual, the tournament of the Pacific Northwest A. A. set the pace. Rev. Leonard L. Daily, of Monmouth, Oregon, won with 409-35¼, while Dr. Cathey followed closely and broke his own record with 406-24¼. At the N. A. A. tournament Rev. Daily shot 424-32 in the regular manner, though competing in the free style event. I was judge at the shooting line and saw it all. He used three natural bamboo arrows in the regular shoot and they all buckled. The disappointment was great; having worked so hard and come so far and yet having sped all the allotted shafts for naught. On being reminded that the rules of the free style permitted any mode of shooting, he tried again with arrows of Port Orford cedar and made good. Daily is a husky type of sky-pilot, as good physically as spiritually. His bow was a straight sixty-six inch self yew with round belly and rawhide backing and a weight of one hundred pounds. He claimed that its best shots had been 390 yards without the back and 432 with it. The winning arrow was 28 inches, 275 grains, three very small vanes cut from the secondary wing feathers of the eagle, 25 calibre bullet point and silk-wrapped nock. On August 23rd, at a family reunion at Watson, Missouri, using the same equipment, he shot 438-4. Back in Oregon, still with the same bow, he made 453-4.



Against the feet, in the 1930 tournament, Curtis made over four hundred yards but the exact distance was not measured, as it was obviously less than Daily's shot, which was worked out for a straight line by a corps of five professional surveyors. Young Roy Case, Jr., also using the feet, really shot farther than Daily but the arrow could not be counted as it flew beyond the field into Michigan Avenue and was thrown back by a policeman, whereas Daily's had stuck in a flower bed by the fence. Roy was a lad of extraordinary strength. He was sixteen years old and weighed a hundred and twenty-four pounds, but the bow he shot in the regular style flight shoot, using the arms only, weighed ninety-three pounds for a twenty-eight inch draw. The boy drew it full every time and, besides, he had shot all day in the target events, which the other two winners had not done. He won that shoot with 362-17, but at the Wisconsin State tournament a few weeks later he reached 376-18.

One would expect that to be a record for boys, and so it is so far as official tournaments are concerned, but it is not the greatest distance that a young boy has shot. Last year, at the age of 15, Jack Daily shot 397 yards and this spring (1932) he has made over 400. His father said of this and another shot of practically equal merit: "The arrows landed just before and beyond the 400 yard mark and in a direct line, so we had no reason for measuring them closer. Jack shoots 80 to 85 pound bows." His friend Ralph Cathey, of the same age, shot 336-6½ at a recognized tournament.

In 1931, "Three Hundreds" were too common to count, but Dr. Tawney of Portland, Oregon, took place among the mighty with 411-17½. At the Oregon State tournament Mrs. Prouty, also of Portland, set a world's record for women of 346-4 and at the tournament of the Western A. A. her husband, Homer Prouty, set one for men at 466-10½. Their mutual record, of holding both world marks in the family, may never be rivalled.

At the N. A. A. tournament of 1931, Mrs. Elizabeth Rob-

erts, of Pittsburgh, won with a splendid new record for the association of 328-14. Then "Pop" Prouty promptly and proudly proved his previously promised prowess by a majestic shot of which I must relate a little anecdote, the most remarkable coincidence of my life. I was again the judge at the shooting line and when Prouty loosed with such speed as to render the shaft invisible, I said: "Did you get a quarter of a mile?" He answered: "Not quite." As we were walking out to find the arrow, a spectator asked me how far it had gone. Rather flippantly I replied: "Four hundred and thirty-six yards, two feet and six inches." When the surveyors turned in the result of their calculations it was that distance to the very inch. As witnesses I refer to Phil Rounsevelle and Roy Case, both of whom saw and heard it.

In this year of 1932, March 12th, Prouty raised his practice record to 472-4, the witnesses being Dr. Cathey and B. G. Thompson of *Ye Sylvan Archer*. The following extract from his letter which tells of this feat is interesting:

"My favorite bow and the one with which I shot 472-4 is of 80 pounds and 5'-8", using a Port Orford cedar arrow 27 $\frac{3}{4}$ " long, 22 calibre point, 260 grains, with vanes of celluloid. I generally use bare fingers but prefer tips to tabs. I have very tough fingers and do nearly all of my shooting bare handed. As to weight of flight bows, I think 80 lb. is as long casting as bows much heavier, as I have shot against bows up to 125 lb. but could outshoot them with 75 or 80 lb. My experiments with bows of light weight are: the best shots, 33 lb.—322 yd., 45—372, 55—419, 60—429, 70—454, 80—472-4". Mrs. Prouty used a 50 lb. reflex with her shot of 346-4."

Superb as it was, that great shot of Prouty's was not destined long to remain the world's practice record. Paul Southerland, of Tulsa, Oklahoma, who had taken second place in the N. A. A. tournament of 1931 with somewhat over 411 yards, using the same equipment in a series of three shots



## FLIGHT SHOOTING

MRS. ROBERTS  
PAUL SOUTHERLAND  
HOMER PROUTY



at his father's home on June 1, 1932, shot one arrow 490-12, another about nine yards less, and the third an unknown distance which was probably the best of all, as it was apparently lost in a hedge that lay a few yards ahead. It was a great pity that this arrow could not be found, as it might very likely have passed 500 yards. The better of the two known shots was carefully measured with a steel tape and I have his affidavit to its correctness, duly executed before a notary public. Here, "at long last," as Jim Duff says, was Mahmoud Effendi's mark beaten, and by a wooden longbow. A few days later, Paul almost equalled the official record by a shot of 462-12 in a tournament of the Wichita Archers, the distance being "chained off" with a steel tape by two engineers of the Atlantic Oil and Producing Company.

In our search for perfection in the making and shooting of flight tackle, we are fortunately able to found a new base for advance upon the work of these great men of the south and west, who, premising that no true archer hesitates to attempt the supposedly impossible, confidently assert that lengths of more than five hundred yards will be cast with the yew longbow.

The bow with which Paul Southerland made the world's longest shot, with any sort of bow except a composite, was five and a half feet long, fished of billets of self yew from Earl L. Ullrich, of Roseburg, Oregon, one of God's own honest men. It was the work of G. M. Lyons, of the Tulsa Bowmen, and weighed one hundred and twenty-five pounds, no less. The arrow was a chested 28 inch, P. O. cedar, with celluloid vanes and weight of 300 grains. Paul made it himself.

Prouty's bow actually measures five feet eight inches from nock to nock but, owing to the reflexion of its tips, it does not look quite so long. Its handle is very deep but rather narrow and several inches of the limbs are so thick that the bend comes fairly far out, though not so far as to make it whip ended. In a sense, it is a bow with very short casting arms

which would be expected to have the quick return that is so fully realized in practice. The most flexible portion of the limb is rather broad in proportion to its depth. The power of pull in pounds that Prouty prefers is from eighty to ninety. In fact, a large school of flight shooters believe that yew gives all it has at this reasonable weight, which is not beyond the strength of most archers who specialize at the flight. It must be borne in mind that even composite bows which carry over four hundred yards are at least so heavy. On the other hand Southerland says: "Some day really strong men will be shooting bows around 200 pounds and records will go up and up."

Prouty's arrows are about 28 inch and of 260 to 280 grains. Somewhat surprisingly, he makes them of Douglas fir in preference to Port Orford cedar, which provides a strong point in argument for the merits of that kind of wood. The nock is reinforced by an inserted slip of rawhide which he says is "the best thing for any arrow." The three small vanes are of celluloid. The pile is a high power cupro-nickel twenty-two calibre bullet jacket. He affirms that a twenty-five calibre tip will give as much as twenty yards less cast than a twenty-two. His strings are easily and quickly made of seine repair twine, which comes twelve threads to the strand, soft laid. He rubs his arrows completely over with graphite and polishes them until they are shiny smooth. Daily, in 1930, also rubbed his arrows with a smoothing powder whose nature he did not disclose but which looked like stearate of zinc. He used an arrow plate of deerskin on the bow with the hair running in the direction of the arrow and before shooting he would treat both this hair and the upper edge of his hand with the powder.

Prouty, Southerland, Daily and Mrs. Roberts all shoot in similar technique which is the result of enormous experience. They spread their feet wide apart and rock to and fro, bending the knees, in a broad, regular swing, drawing the arrow a little more at each back step in an elevation of forty-five



degrees. After four or five of such oscillations a supreme moment comes when the whole body is thrusting its weight and power in the direction of intended flight, while the arrow has just attained full draw. At that instant of adjuvant strain and stress the shaft is loosed and lost.

That last word I use advisedly. An arrow whose speed will carry it not more than three hundred and fifty yards can usually be seen by the archer while it is in flight. Between that velocity and such as will give a length of four hundred yards there is an indefinite limit beyond which the shaft is invisible, at least under ordinary conditions, from the instant of quitting the bow. "Quarter Milers" judge in that way of the success of their shots.

All expert flight shooters, without exception, say that perfectly calm weather gives the greatest distance. While it is obvious that an up wind is wholly bad and a side wind somewhat so, yet nearly everybody who has not had experience will suppose that a down wind helps the flight of an arrow by carrying it along as everything else is carried when the wind is behind it. If we were considering the projectiles of firearms this would be true. It is also true of arrows that are shot at the target ranges, but it is not true of the extreme casts of the modern mighty flight bows. For one thing, if the arrow have passed the peak of the parabola and be coming down, a wind from behind will trip or tip it up and send it down straighter. Probably the chief hindrance comes from the inequalities that exist in all currents of air, for few winds, if any, run in smooth streams. Roger Ascham ably pointed that out from observations of loose snow drifting about on a crusted surface. Arrows will wobble in all winds and so meet with increased resistance in unequal and disconcerting degrees. Curtis has tried repeatedly, in the intense gales that sweep his prairie home, to loft his arrows above in a bold bid to Boreas to blow them about in the blustery blast of his breath and bear them beyond the bounds of belief but in no such instance have they travelled so far as on a clear day.

## XIV

### COMPOSITE BOWS

FROM the first chapter onward, I have made occasional references to the composite bow of the Orient. Undoubtedly it is the highest product of the bowyer's art in all the world and in all history. Though our own tradition is all toward the bow of wood, we probably would use the composite bow a great deal if we were not deterred by the extreme difficulty of making it and by the very high cost of ancient specimens.

All archers know that the shorter a bow is made the better will be its cast. Wooden bows are as long as they are, mainly to avoid fracture. The more nearly the ultra-modern bows have approached the principles of the very short composite bows, the better they have shot.

In Asia, it seems to have been devised principally to meet the need for a short bow to be used on horseback, so that the rider could turn easily in his saddle, shoot with either hand, and cover an immense range of open ground. Therefore we are not surprised to find that it most nearly reached perfection among the riding tribes of the steppes, such as the Scythians, Parthians and Turks. Another influence toward its conception might have been that suitable bow staves were not so plentiful in those regions as were the ruminant animals who furnished the materials used in its construction, for a composite bow is only a very thin strip of inert wood with horn glued on one side for a belly and sinew glued on the other for a back. Furthermore, although it was developed for the requirements of nomads, its inherent superiority caused its retention after the wandering hordes conquered and settled in more fertile lands, whether India, Persia, Asia Minor or Greece.

The powerful little weapon is well known in art and legend, too, for it is the bow which has sent its unerring shafts straight to the hearts of all of us married people and perhaps has even taken a shot at some of you youths and maidens, the bow of Don Cupid. This curling little weapon is nothing else than the composite bow when it is strung, when the short, powerful arms are bent sharply back till what looked like the back has become the belly and the end-pieces stand up and down like the ends of a wooden bow. This is the bow of the Greeks, the weapon with which Ulysses shot down his wife's admirers as they tried to hide behind the great table which they raised up for a shield.

Like everything the Greeks touched it became shaped in beauty, at least when strung, and in that form has persisted in decorative art till the present time. Recently I talked on archery at a luncheon of the Penn Athletic Club, in Philadelphia, immediately following the great comedian, Mr. Fred Stone. To catch the attention of the audience with the first sentence I pointed out the fact that the Cupid's bows with which the walls were adorned all had loose strings flopping about them and then I lifted up a Korean bow to show them what would really happen if the cord were unnocked.

Not long ago I noticed what seems to me a good joke on a man dead since the classic days of Greece. In the article on Greek art in the *Britannica* there is a picture of the "Vase of Orvieto," on which the archers are shown in the act of shooting with their reflex bows held backward. So, as with artists of all ages, that master craftsman recorded his ignorance of subjects outside of his own sphere.

Considering the great power of those composite bows, especially of the later Greek civilization in Asia Minor, I have wondered that they were not introduced into general use in northern Europe by returning crusaders.

Not long ago I read *The First Crusade* by Prof. A. C. Krey, of the University of Minnesota. It is a vital book of

intense interest, consisting of exact translations of the original narratives of the expedition by men who took part in it. Personally I had no idea that so many accounts were still in existence.

All through that story of unspeakable hardship the narrators speak of the archery of the Turks with great respect, if not even fear. When the battles were in the open field the method of Turkish attack was to encircle the Crusaders with a revolving ring of mounted archers, very much as did the American



From an Arabic Treatise on Archery in the National Library at Paris.

Indians of the plains, and shower them with arrows. There are phrases which imply that the bows of the infidels had so much greater range than the wooden bows of the Christians that the latter were powerless against them, and in one place at least their composite nature is indicated, for, while the bows are said to be of horn or bone, that statement is probably not absolutely literal. I will give some suggestive quotations:

“Soliman, having heard of the arrival of the Christians, assembled from all Rumania and the territory of Chorosan fifteen thousand of his Turks, most agile archers, very skillful in the use of bows of horn and bone.”

“Three thousand pilgrims entered the ruined fortress in

hope of defense. But finding no gates, or other obstacles, and anxious and deprived of aid, they piled up their shields for a gate, along with a huge pile of rocks; and with lances, wooden bows, and sling-stones, they bravely defended themselves from the enemy. But the Turks surrounded the fortress, which was without a roof, on all sides. They aimed their arrows high, so that, as they fell from the air in a shower, they would strike the bodies of the enclosed Christians, destroying the poor wretches."

"Nicaea was then in possession of Turks from the East, a valiant race of very expert archers. These had crossed the Euphrates River from Persia fifty years before and had subjected to themselves the whole land of Romania (Asia Minor). Oh, how many severed heads and bones of the dead we then found beyond Nicomedia, lying upon the plains near the sea! These people, inexperienced in the use of the arrow, the Turks had annihilated."

"But after this was all done, the Turks were already encircling us on all sides, shooting far and wide in wondrous fashion."

"There Walter the Penniless fell, pierced by seven arrows which had penetrated his coat of mail."

These entries were made in the journals in June, 1097. Two and a half years later, about December, 1099, there is a statement which may possibly indicate that the Crusaders were reduced to the necessity of using bows made of pieces of broken ones glued together, but which I think more probably means that they had come to recognize the superiority of the Turkish artillery and had adopted it.

"If Lord Baldwin had not on that day guarded our rear, perhaps they would have killed many of us. For our bows and arrows were spoiled in a rain-storm, since in that region they were fastened together with glue."

It is largely this sentence which makes me wonder why they did not take the composite bow to Europe, since it implies that

they were carrying it, and yet part of the answer may be inferred from the text itself, namely that the bows would not stand the rain.

Dr. Pope says, "An elaborate composite bow would quickly lose its utility in a damp climate." Perhaps so; certainly so if the dampness meant a continued drenching in a rain-storm. Yet I have seen bows bought in Constantinople, Canton, Korea and India, right beside the sea. I believe the reason was more psychological. The composite bow is a tricky little thing both to make and to shoot. It has none of the frank simplicity of the straight wooden bow. Though it may seem an utterly insufficient reason it is difficult for me to visualize the bowyer of Western Europe concerning himself with the many baffling turns and close fits of the different materials of the composite weapon. One must bear in mind the racial differences which produced the heavy wooden carvings of early Europe and the exquisite traceries of the East.

Composite bows from all parts of Asia are so reflexed, or turned backwards so far, that they look like a reversed letter C. I personally have owned nine of them and have seen a great many more in museums.

I have five Chinese bows, two from my classmate Dr. Cadbury, Professor of Medicine at Lingnan University, Canton, another much handsomer one that was given to Ambassador Rockwood as an official present from the Chinese government, and two from James Clarke of Ardmore, Pa.

Somehow there always seems to be something wrong with what a Chinaman makes, unless it be his silks and pottery, for while his workmanship is exquisitely exact, some peculiar error, which strikes our occidental minds as of childish simplicity but which his conservative habits force him to repeat because his forefathers did it, is sure to spoil the whole thing. So with the bow; the reflex principle is correct and the materials are good but it shoots with a cast that deserves nothing but contempt. Primarily it is too long, six feet two inches





A MONGOLIAN PHOTOGRAPHED IN 1932

*Acme*



from end to end, thus losing every advantage that might be gained from shortness. In this respect it is therefore no better than a wooden bow. The last twelve inches of each end are formed of heavy wood, probably mulberry, which bends not at all and adds immensely to its initial inertia.

As one of my bows was broken I dissected it to learn what it can teach of the methods of composite construction. The handle is about five inches long, the limbs two feet and the stiff ends make up the total of slightly over six feet.

Inasmuch as several attempts by modern Americans to make composite bows have been only partially successful, I determined to saw a limb into cross-sections at every inch and thus show the cunningly joined materials in their correct proportions.

The centre cut is a seven-eighths inch circle. Measured with a steel scale the components are: Horn, thirteen sixty-fourths, bamboo, nine sixty-fourths, hardwood, perhaps mulberry, twenty-three sixty-fourths, sinew thirteen sixty-fourths. These are very exact but it would do as well to say: Horn, three-sixteenths, bamboo, one-eighth, wood, three-eighths, sinew, three-sixteenths.

The next inch shows the relative proportions the same but reduced to a total diameter of thirteen-sixteenths. The second inch from the centre shows the round handle merging into the flat limb, although the proportion of hardwood is still enough to give considerable stiffening. The third inch shows the flexible bamboo relatively thicker and the hardwood tapering away, while, at the fourth inch, it has completely disappeared and the bamboo occupies the whole ligneous field. Here the circular outline has changed to a perfect ellipse with a major axis of exactly one inch and a minor axis of five-eighths.

From this point on I have omitted twelve sections because they are exactly like the last one. This part is the true casting limb and it is in its excessive length that the weakness of



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10



15



20



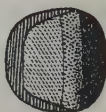
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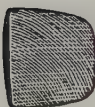
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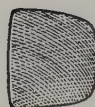
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6



11



16

the bow lies. If these arms were short and strong the power of the weapon would be tripled.

So far, the general curve of the uncut bow is an almost perfect arc of a circle, about as much as an English bow when strung, though you must always remember that the curve at rest is toward the back in a reflexed bow, but, from now on, the back becomes more pointed until it assumes a triangular shape. When this form is attained the bow bends much more sharply into the rigid wooden end, making in a general way, although the line is curved, an angle of about forty-five degrees.

I am sure that almost everyone who has given serious thought to the structure of an Oriental bow has wondered how the joint between the composite limb and solid wooden head was made. Such an enormous strain comes at that point that an extraordinarily strong yet slightly flexible union is required.

These sections show the method very clearly, a wedge-splice, very much like that on a footed arrow, but firmly supported by the horn for six and one-half inches and by the sinew for thirteen inches. I have, therefore, begun showing the sections again at the nineteenth inch from the centre of the grip, where the tip of the wedge of hardwood first appears in the bamboo. The succeeding sections speak for themselves and require but little comment. The bamboo finally ends at the same place as the horn does and, just there, the hardwood forms an exact right angled triangle. Here is where a bone string-rest is bound on the bow, by sinews passing around the outside of it, and, just beyond, the wood is shouldered down to the almost square shape which it maintains, though with slight narrowing, to the end, at the same time the sinews gradually thinning away.

So much then for the details of this piece of exquisite workmanship whose only fault lies in its length and the weight of its head.

When our class of 1899 had its twentieth reunion at Princeton I asked my friend Walter Erdman, who was a missionary in Korea, to keep his eye wide open in case he might chance to espy a good reflex bow in that ancient and primitive country. In 1924 we met again, at our twenty-fifth reunion and, though I must confess that I had forgotten the request, he had not, for he had brought with him the most curious reflex bow, or at least the most primitive, in my collection. He told me that for the whole five years he had had the quest in mind but during that time had never heard of a bow until, just a few days before sailing, word was brought to him that there was still an aged archer living some distance back in the country. Erdman visited him, found that he shot with this very bow, bought it, with three arrows, and brought them to me.

It is a weapon of crude workmanship, with none of the beauty of the Chinese ones, and yet it is a better bow. It is forty-seven inches from nock to nock, and the nocks are about as near the end as they could be. The limbs are of the same length, as in all composite bows that I have seen.

The grip is of leather, four and one-half inches wide, and a piece of thick brown felt, two and three-fourths inches wide, is glued over that, leaving seven-eighths of an inch of leather protruding on each side.

The first foot of each limb, beyond the grip, is bellied with two pieces of horn, the first piece being about seven inches and the second piece about five inches. The union of the ends of these slabs of horn, scraped so thin as to be transparent, is made by thinning them still further to a wedge exactly one and one-half inches long and gluing them together with the first one on top. To reinforce the bow at this point and presumably to hold down the horn a piece of bamboo exactly one inch long is bound tightly to it with string.

The second, and shorter, piece of horn is bound down in the same way at its further end and beyond that nothing shows on the belly but wood. It is a hardwood which looks to me



like teak, though I am only guessing, and four inches from the end it has been more strongly curved and set, I suppose by the action of heat. The string-rest is glued on this angle, not tied on as in the other bow, and instead of being made of bone is a little pad of leather covered with red plush.

The sinews forming the back extend the whole length of the bow and are not covered with anything. At their widest part, about four inches from the end of the grip, the limbs are one and one-fourth inches wide and from there they taper to seven-eighths just before the string-rest. There is no ornamentation except a little silk and leather covering the nocks.

The weight of this little bow for a twenty-eight-inch draw is only thirty-six pounds but two or three inches more jump it up to forty-eight. As the arrows are thirty-three inches long it is a fairly strong weapon, but its cast is not much over 150 yards.

When the Centennial Exposition was held in Philadelphia, in 1876, one of the main buildings was built in permanent construction and has been used ever since as a museum. I remembered that in one of the show cases were three reflex bows from India so, after I had dissected my Chinese bow and learned the principles of its construction, I visited Memorial Hall, as the museum is called, and sketched and measured the bows.

They are all much shorter than the Chinese, varying from thirty-six inches, or less than half its length, to forty inches.

One of them, which to my eye looks like the best weapon, is so reflexed that in outline it is exactly like a crab with his arms in front, as in eating. None of the Oriental bows shown in *Badminton* is reflexed nearly as much as this one except the Persian bow whose ends actually overlap.

Here I would like to say that my own observations lead me to believe that the degree of reflexion and general build of these bows does not form nearly so accurate a guide to the country of their origin as the books would have us believe.

For example, while the Manchu bow that I have described as being given to Minister Rockwell came from the royal family and therefore probably was of Manchu design, two others were bought in Canton, which is in the south of China. To be sure they might have come down from the north just as easily as they afterward came to America but there is no proof of it. However, I once saw and handled a beautiful little reflex bow from Peking, that an American soldier had brought back from the Boxer rebellion, and it was as much like a Turkish bow that I saw last summer, except for ornamentation, as two peas in a pod. This Turkish bow was given in the Tournament of 1924 as a prize for the flight shoot and was won by Professor Curtis. It was light in structure but shaped exactly like the superb bow which is illustrated. Certainly the Chinese bow of that shape is not the kind usually mentioned.

The crab-shaped bow of the Centennial came from Delhi, India, but so did the other two, and they are of the shape given in *Badminton* as Indian but which is also the shape both of the Turkish bow now owned by Professor Curtis and another very much more powerful, but broken, one which Mr. Trowbridge gave as second prize to Dr. P. W. Crouch. Then my Korean bow is a thing in a class by itself but of more the crab shape than any other, except that it has short arms like the bows usually called Persian. I suppose an expert could tell by the ornamental designs painted on the bows but otherwise I think the bowyers largely followed their own fancies.

In principle, however, they are all the same. When I looked at those Indian bows, although they were clothed in birch bark elaborately painted, I was sure that if I had X-ray eyes I would see the same arrangements of the materials that are disclosed in the cross-sections I made. Yes, if any American who is handy with tools will follow those ideas but make his measurements such as I am about to give he will sooner

or later turn out a good composite bow.

The measurements of the crab bow are: Handle, four inches, arm, ten inches, elbow and thickened piece, five inches, wood end, four inches. Greatest width, one and seven-eighths inches.

The other two bows have arms straight with the handle and ends at right angles. Their measurements are: (1) Handle, three and one-half inches, arm, nine and one-half inches, elbow and wooden end (the elbow being very short), six and one-half inches. (2) Same handle, arm, nine inches, end, ten inches. You see there is great latitude allowed to the bowyers.

A modern archer who expended a great deal of time and money on the study of the composite bow was Sir Ralph Payne-Gallwey. In 1906, the year after his excellent flight shooting at Le Touquet, he wrote and privately published a thin folio of only twenty-six pages called *A Treatise on the Construction, Power and Management of Turkish and other Oriental Bows*. A copy of this rare work now lies before me and gives us much of value, even though we cannot but regret the almost total lack of scientific treatment.

From it, we find that his experience and knowledge were gained from having owned about twenty Turkish bows, of which only four were fit for shooting, and from having examined about thirty others. Of the best bow that was within his power to draw, the measurements were: length along the outer curve when unstrung, 44 inches; length of bowstring, 33 inches; greatest width of arms,  $1\frac{1}{8}$  inches; thickness at six inches from the centre, one-half inch; weight 118 pounds; weight in hand,  $12\frac{1}{2}$  ounces.

The kind of wood is not specified, but it was made in three pieces, a handle single fished into two limbs which varied in thickness from one-eighth to one-quarter inch, except at the ends, where they became enlarged for the nocks.

The horn was of buffalo or antelope, in two strips which retained their natural curve and met in the centre of the handle.

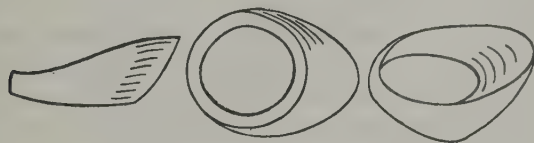
The sinew was from the great tendon in the back of the neck of the ox or stag and extended from end to end. Sir Ralph said that when this belly of sinew is taken off a Turkish bow, no matter how old the bow may be, and is dissolved in hot water, it will disintegrate into hundreds of short pieces from two to three inches long and about an eighth of an inch thick. All three strips, of wood, horn and sinew, when separated, are so flexible that they can almost be coiled around the fingers, but when they are joined together they make a weapon of enormous strength. The composition of the very strong and elastic glue which joins the strips together and in which the sinew is laid was not known to Sir Ralph.

Another bow of his weighed 160 pounds and he was not able to draw it. The thickness of the limbs was three-quarters of an inch, which seems to have been the maximum for Turkish bows.

While the Orientals could string these bows by hooking the lower end over a shin, pressing the back of the thigh of the other leg against the handle and pulling with the hand on the upper end, the operation requires great strength and so much skill that Sir Ralph could not do it himself nor did he know of any other European who could. His method, which was also described to me by Duff, was to lay the bow on a broad board in which were a number of properly placed holes for pegs. The bow was then braced by bending the limbs a little at a time and pegging in front of them to hold the gain of position. If, in bracing a bow by hand, it be given any torque or be allowed to spring itself into a twist, as it is only too apt to do, the horn belly will be splintered and the whole thing ruined. This accident has often happened to composite bows that are for sale in antique shops and is hard to detect

because of the ornamental casing of skin or bark with which they are usually covered.

The arrows were all alike, from  $25\frac{1}{2}$  to  $25\frac{3}{4}$  inches, barrelled, balanced at twelve inches from the point and much tapered from there forwards. The tips were of ivory, one-eighth inch thick and one quarter long. An examination of about two hundred 18th century arrows showed those measurements to be practically universal. The nock was made of two tiny naturally curved wooden sides glued, not on the sides of the shaft but abruptly on a wedge shaped end, the whole being wrapped with fine sinew thread laid in glue and the sinew cut out of the open sides when dry. It was distinctly springy and would hold the arrow securely on the cord and ready to be shot, even though the archer were on horseback and not touching it. The feathers were stiff but thin as paper, two and a half inches long by one quarter high at the nock, for, not being ruffled by the thumb draw, they reached clear back to the nock. Sometimes parchment was substituted.



Turkish Thumb Ring.

An important part of the tackle was a very thin piece of grooved horn, or often tortoise shell, about six inches long, one wide, one-quarter deep and one-sixteenth thick. The bottom was slightly convex in the longitudinal axis, sloping from the centre to the ends. It was worn on the left thumb by a leathern collar, or ring, and a short plaited silken cord, attached to the front end, was held by the fingers to steady it.

A thumb ring made of some hard substance was always used for drawing the bowstring. It was made of ivory, silver,

agate, iron, or the like, the ones of precious material often being worn permanently as ornaments. The inner side had a shelf, or lip, for the string to rest on, that was flat on top, sloped on the bottom and hollowed out inside. To retain the string under the strain of the draw, the sloping under side was pressed against the side of the hand. Contrary to expectation, the ring does not bruise or excoriate the thumb if it be properly fitted. Sir Ralph says: "The release is quick and clean as the snap of a gunlock and very different from the dragging action that occurs from the leather-covered tips of three fingers." He was always able to shoot much further with the ring than without it.

The Turkish bowstring was made of an endless skein of about sixty lengths of strong silken thread, held at each end by a loop of hard sinew. The silk was not twisted at all but was served a little at the ends, for three inches at the middle of the arms and for a like distance in its centre.



Sinew Loop  
and Knot.

Sir Ralph reproduced a letter from one of his ancestors who saw Mahmoud Effendi making his famous shot of 482 yards in the presence of what he calls a great crowd. An interesting quotation from it is the following:

"Waring said that the furthest distance attained with an English flight arrow, of which he had ever heard, was 335 yards, and that Lord Aylesford had once shot one, with a slight wind in his favor, 330 yards. Waring told me that he himself, in all his life, had never been able to send a flight arrow above 283 yards.

"The Turk was not satisfied with his performance, but declared that he and his bow were stiff and out of condition, and that with some practice he could shoot very much farther than he had just done. He said, however, that he never was a first-class bowman, even when in his best practice, but that the present Grand Seigneur was very fond of the exercise and



a very strong man, there being only two men in the whole Turkish army who could shoot an arrow as far as he could. The Turk said that he had seen the Grand Seigneur send a flight arrow 800 yards."

A few years ago I would have been willing to venture an absolute statement that records of shots of 600 yards and more, made by the Turks, were grossly exaggerated and wholly impossible. Now, I am getting more and more inclined to give them credit and to believe that one of the greatest nations of flight shooters of which history tells us would not have erected marble pillars either to the spurious exploits of liars or out of a boot-licking servility to archers of high social rank. In this opinion Sir Ralph apparently agreed.

In 1797, Sir Robert Ainslie, Ambassador to the Porte, secured a list of inscriptions, and had them translated by his interpreter, that were carved on marble columns raised to perpetuate the memory of noteworthy shots made at the Ok Meydan (Place of the Arrow), or shooting field of Constantinople.

Of twelve cited by Sir Ralph, as well as by other writers, the shortest reads: "Ak Siraly Mustapha Aga shot two arrows both of which travelled to a distance of 625 yards." The longest: "The reigning Emperor, Sultan Selim, shot an arrow which drove into the ground at a distance of 838 yards. The Sultan shot a second arrow to near the same distance." The other ten shots, by various men, were 628, 630, 685, 729, 759, 760, 762, 764, 805, 810.

There certainly is plenty of evidence to show that Mahmoud's English records were authentic. In the *History of the Royal Company of Archers* is recorded a letter of July 11th, 1794, the year before his great shot, which says: "To our utter astonishment he (Mahmoud) shot against the wind, by my stepping, 415 yards and back again with the wind 463 yards."

The German magazine *Der Islam*, for 1925-26, published by De Gruyter & Co., of Berlin, contains an abstract by a Joachim Hein of a Turkish treatise on bowery by a Mustafa Kani. However accomplished a linguist Hein may have been, he certainly was no archer, but, fortunately, we may still separate the original work of Kani from out of the picayune rubbish of his commentator. I have used an English translation by D. M. Corrough, of Highland Park, Ill., who has been engaged for several years in getting ready to make a composite bow, but I also will interpolate material from other sources.

First of all, it is the natural curve of the horn used for the belly which determines the shape of the bow. Steer horn, therefore, cannot be used satisfactorily because of its compound curvature, as Saxton Pope discovered when he had to cut horn of that sort into small strips and glue them together. The bow that he made that way was probably broken by me in the flight shoot of 1922, some of those joints working loose. The best horns that have simple curves are those of the water buffalo of eastern Asia and of some species of antelope. Many authorities believe that the "wild bounding goat" from whose horns Pandarus is said by Homer to have made his bow, was in reality an ibex.

Practically, buffalo horns are and have been the only kind used. They swing out from the animal's head in broad, spreading, simple and equal curves, so that strips sawn from the tops and bottoms of the opposite horns can be paired with each other in the two limbs of a bow. Kani says that the tops are soft and the bottoms hard and that the two tops or two bottoms should be paired but never a top with a bottom.

A Greek writer said that the bows of the Asiatics were always shaped like either the letter Sigma or the letter Omicron. If one study the buffalo horn he can see why this is so. When the convex side is glued to the central wooden

slip and the ears are pointed forward, the curves in each arm are opposed and the Sigma shape is produced. In this kind of bow, when at rest, the limbs lie in front of the line of the handle by several inches but the effect of the bow in general is one of length. In the Omicron type, where the effect is annular, the concave sides of the horn, considered longitudinally, are affixed to the wood and the ears continue the curve even more sharply. This kind of bow may vary, according to the degree of curvature inherent in the original horns, from a letter C to an overlapping like a pretzel. Kani says that the freshly cut pieces of horn may be immersed in clear water that is heated over chips, pressed into shape and then doused in cold water to be set. I believe, however, that such modifications of the original form are of but secondary importance.

There is no insurmountable difficulty in obtaining these horns. When Corrough wrote to G. M. Khan & Sons, 11 Tiljulla Road, Calcutta, India, for prices, they suggested that he buy a ton as a sample order. I suppose that Khan is the Indian for Cohen.

The wooden centre piece of Kani is exactly like that described by Sir Ralph in shape but, rather surprisingly, it is said to be of maple wood, which, he says, soaks in the glue. This may or may not be a translator's error, but it is true that the centre need have no strength of cast in itself, practically its only functions being to establish the shape of the bow and to hold the glue. In the best flight bows the handle is carved entirely out of the maple but in other bows it is often reinforced by a hard wood, like that of the cornel cherry.

So far as I can make out, the sinews are from the Achilles tendon of the stag, cow and ox, the neck tendons not being mentioned. After having been dried in the sun until as stiff as a stick, they are pounded with a club until soft and fibrous. It seems to me that the translator may have omitted an intermediate steeping in water, but maybe not. They are then

scraped with a knife, cleaned and drawn through a hatchel until they are like flax and the flesh is taken off. For Americans, a good source of sinew is the Alaskan reindeer, about which the latest information can be obtained from the government.

All American amateurs who have tried to make these bows agree that the greatest problem is presented by the glue, and at least one English writer on the composite bow asserted his belief that its manufacture ceased because the secret of the ancient method of glue making was lost. We may therefore be relieved to note that Kani does not mention any unknown sort of adhesive. He says that the best glue is prepared from the cut-off ends of the sinews by cooking them at a low heat in pure rainwater and from time to time pouring off the dirt and fat. It is then reduced on a water bath, allowed to settle, and the excess water is poured off. The thick, sticky remainder is then warmed, stirred and poured into a flat vessel to dry. It can also be made from the ears and hides of heifers. Fish glue is sometimes used, the best being made in a similar manner from the skin of the upper gums of sturgeons, to which Hein affixes the scientific names of *Morina balaghy* and *Gadus morrhica*.

This kind of fish glue appears to me to be the same as, or similar to, Russian isinglass, and just as most of our experts recommend an addition of it to animal glue, so Kani says that it is well to combine the two.

We may also note, for what it is worth, the following footnote to page 133 of Hansard: "Oriental bowyers use a peculiar kind of glue, made from a root called in Turkey *Sherischoan*, which they grind like corn between two stones, until it resembles sawdust.—THEVENOT."

The U. S. Department of Agriculture, after intensive search because of the interest of Associate Chief K. F. Kellerman, an archer, is unable to determine what the plant may be.

The ears, or angulated ends of the wooden centre, are bent



THREE VIEWS OF A TURKISH COMPOSITE BOW





by soaking the wood in cold water for three days and then cooking it in the water at a low heat until it is soft, or else warming it while wet over a fire of chips. An end, or ear, is then stuck through a hole in a board and the bend made by pressing the body of the bow toward the board and holding it there by lashings until it is dry. In practice, one must make a greater bend than he expects to be permanent.

Before the horn strips are glued on, the wood is carefully scraped to fit their transverse curve.

In all gluing operations, the opposing surfaces of wood or horn are excoriated in fine parallel lines by a toothed metal scraper. To glue the horn to the wood, both are covered with a sizing of glue and allowed to dry. They are then pressed together and bound by a cord as thick as the finger to a wooden form of the desired shape. The whole is then baked for five or six hours, cooled, and the form removed. This process is repeated with the other limb and a shim of bone is fitted between the two ends of the horn, in the middle of the grip, to make all snug.

To glue on the sinew, the bow is reflexed as far as the horns will allow and the ends held there by being tied together with string. Any dead glue which has been slopped on the back of the wood during the process of affixing the horn is carefully scraped off and new glue is applied and allowed to dry. The text of Hein is confusing just here. It seems to me to mean that five overlapping pieces of sinew are required to reach the full length of the bow, but it may mean that the sinew is laid on in layers to a depth of five strips. To what extent the sinew is permeated with glue, I cannot learn for certain, but I think that each layer is well painted with glue before it is laid on. Neither do I know if the sinew is to be baked as the horn was.

A method of bracing the bow is given which consists in fastening a loose rope to the bow ends, standing inside of the slack, taking a twist in it by rotating the bow end over end

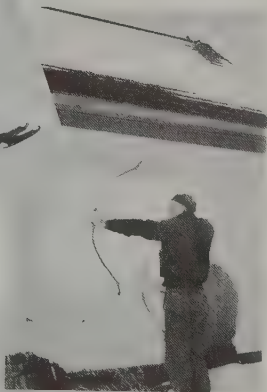
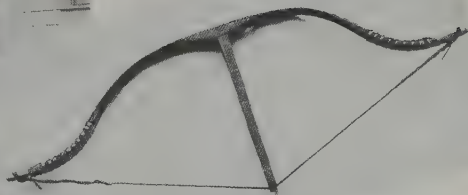
to bring the rope tight around the body, and then, assuming a sitting posture, pushing out the handle with the feet.

The thumb ring, according to Hein, is worn in a reversed position from that prescribed by Sir Ralph and, after making one out of horn and shooting it in both ways, I am inclined to think that Hein is right. Sir Ralph turns the scooped-out side uppermost, or toward the wrist, while Hein, or maybe Kani, turns the hollow down over the ball of the end joint of the thumb. In spite of Sir Ralph's assertion that the ring does not hurt the thumb, I found that when used in his manner it was very painful, even to drawing blood after repeated shots. Of course my ring was probably very poorly fitted, but the same experience befell some archers in Washington, D. C., who made the same experiment. By the Kani way it fits snugly and, if the tip of the thumb be tucked under the forefinger, holds the string well and without pain.

I know of only three men of our race who have been successful in making one or more composite bows, though none of them has produced a weapon which could vie in quality with the best products of the ancient Orient. All started with the slogan, "A white man can do anything a brown man can," but none has seen his boast fulfilled.

The first was Dr. Pope, who succeeded in making a sweet, serviceable weapon, but he did not grasp the underlying principles of construction in that he carried the elasticity clear to the ends of the bow without providing stiff ears. It shot as well as a good yew bow of the same weight, or perhaps better, casting about 275 yards for about fifty pounds.

The most persistent experimenter has been Dr. I. Vincent Cole, of Seattle, who has made four or five very good bows; with admirable patience collecting his materials from far and wide. For wood, he has used osage and bamboo; for sinews, those of the whale and different ruminant animals; for horn, one of musk ox, which he says is quite dead, and the rest of water buffalo. He writes that "no other horn but the water



DR. COLE AND MR. HUBBELL WITH COMPOSITE BOWS  
KOREAN ARCHERS



buffalo is of any use, it being a waste of time to use anything else." For the first pair he paid a curio dealer twenty dollars. He now has three bows of 42, 43 and 50 inches, weighing 75, 80 and 100 pounds at a twenty-two inch draw. His best distance is 290 yards. In the N. A. A. tournament at Seattle, in 1932, both Dr. Cathey and Homer Prouty shot his best bow and got about 265 yards, although they were afraid to pull it all the way. The workmanship in them is very fine, as the doctor is an amateur violin maker.

Richard P. Hubbell, of Seymour, Ct., has made a couple of composite bows, using steer horn from the Chicago packing houses and deer tendon secured by his hunting friends. He used casein glue in the first one and it is his belief that the adhesive was crumbling when he made a trial flight shot, which measured only 191 yards, because, for two months before, the bow had shot very strongly at the targets. The second bow has not yet been tried. Hubbell has experimented with about fifty kinds of adhesives, with the result that he believes good animal glue with an addition of ten percent of Russian isinglass to be the best.

If osage orange be used for the wooden strip, it must be treated with ten percent caustic soda before it will hold glue. In fact, many woods hold glue better after such an application. Frederic L. English who, as a chemist with the makers of a famous cement, ought to know a lot about such things, has had perfect success in attaching whalebone to various bow woods. He gives me the following prescription: Use B2 Tested Ground Glue made by the Baeder Adamson Co., of Philadelphia. Take of dry glue 20 grams, water 40cc. Soak 24 hours cold and then dissolve at 140 degrees Fahrenheit or less. While it is warm add 10cc. of glacial acetic acid and bottle it. This is used cold and can be kept indefinitely.

Unquestionably, the difficulty of making an Oriental composite is enormous. Yet we must remember that the poor Asiatic bowyers had only the simplest materials and tools. I

believe that we can duplicate their products if we come to a fuller understanding of the requirements, use the same things that they use and take enough time. I have heard that they will not shoot a bow in less than half a year.

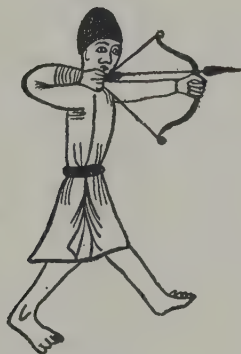
Especially am I glad to say that the art of making composite bows of the best type is not extinct in the Orient, as so many writers have led us to believe, and I have a specimen in my possession that was made in India within the present century. It was a gift to me from Major J. J. B. Farley, the British champion for 1925, who was stationed for many years in the province of Sind and, while there, made the acquaintance of an old bowyer of the genuine species who still carried on the ancient craft. My glorious bow, for such it is in workmanship, design and exquisite ornamentation, is of the comparatively rare Sigma pattern and is so strong that I have never been able to draw it. I judge its weight at perhaps a hundred pounds.

A year or two ago the old bowyer died but the business is still carried on by a nephew. Quite graciously, the major, whose address is Budleigh Salterton, England, has expressed his willingness to import from India as many bows as can be produced by the slow methods of the East, with the intention of selling them at an equitable but as yet undetermined charge. I believe that the archers of Europe and America will do a real service toward the preservation of one of the world's great barbaric arts if they buy enough of them to insure the continuation of their manufacture. They may be had of moderate strength for target work or of great weight for flight shooting, though exact poundages in our usual sense cannot be specified.

The major also gave me two featherless arrows which are used with such bows by the Sindis for killing birds. In shooting, the arrow is set on the string at an angle, the bow is held parallel to the ground, and the arrow turns in its flight and knocks the bird down with a side wallop.



To show what sort of knowledge flows from some of our revered founts of learning, I append this footnote by Professor J. L. Myres in Wells' *Outline of History*: "The bow was probably the composite bow, so-called because it is made of several plates (five or so) of horn, like the springs of a carriage; it discharges a high-speed missile with a twang."



From Arabic Treatise on Archery in  
National Library at Paris.

## XV

### GALLIMAUFREY

THIS chapter is like the small boy's pocket or the débutante's top bureau drawer, so, as something must be the first to be pulled out, let us suppose it to be the Archers' Paradox.

My first experimental work on it was carried out in 1913.

What I did was to construct a heavy stand of four 3 x 4 timbers, properly joined by other boards so that the whole was very heavy and solid. I fastened a bow tightly to a front cross-bar by two U-bolts and arranged a mechanical catch for the string with a trigger. Duff's arrows were used. When I shot the thing it did exactly what one would expect, that is, at sixty yards it threw the arrows far off the target to the left. There was no doubt about it; the reasoning of Ford and Walrond fell all to pieces because the stresses and strains on the shaft itself were not sufficient to keep it straight. The fact was proven that the bow as well as the arrow must be free to move.

Eleven years later the same experiment was undertaken by Dr. Pope, Arthur Young and Stewart Edward White, as part of the preparation for their famous hunting trip to Africa. They used a firmly planted post, by which the bow was held in a clasp lined with an old inner tube for resiliency. Two wooden fingers, released by a trigger, held and loosed the bowstring. Their more important findings were that the arrows threw, or flew, about six or seven degrees to the left of where they would have gone if the bow had been shot by hand, that a diameter of eight inches was the best grouping for six shots with one arrow, and that different weights of

bows made a difference with individual arrows. They found that a light arrow would not stand in too heavy a bow, as every archer knows from empirical experience, and they rightly surmised that the pressure of an arrow shot by hand shoves the bow hand away from it, or to the right.

In 1925 I determined to make more exhaustive experiments along this line and I therefore constructed with great care a new machine for holding a bow which was much superior in every way to the one I made a dozen years before. It consisted of a strongly braced framework, with four legs, which held a movable arm, to one end of which the bow might be attached while at the other end was a mechanical trigger. This arm swung vertically on a heavy iron bolt, which was run through the block at the front end, and the rear end followed a curved slot in a guide so that it could be fastened by a set screw at any desired elevation from the horizontal to forty-five degrees. The string was caught back by a shallow metal hook which was pivoted on a little wooden block resting against the right side of the string. When the hook was moved slightly the string slid off, without any lateral deviation.

The bow was held against the head block by a piece of wood tightened by four long screws. These pieces of wood were of three shapes, one which fitted the handle of the bow exactly and held the bow absolutely as tightly as a vise, one which contained a much larger opening which I filled with sponge rubber to imitate the softness of the human hand and a third which was merely a crosspiece designed to hold a thick wad of sponge rubber against the bow just strongly enough to keep it in place.

I began with the tight grip and a light hunting arrow which was stiffer than a target arrow but not nearly so stiff as a heavy hunting arrow. The bow was a fifty pound lancewood.

At first everything seemed to work as was expected, the arrows flew about five feet to the left of the target at sixty yards with fair consistency and when I aimed a correspond-

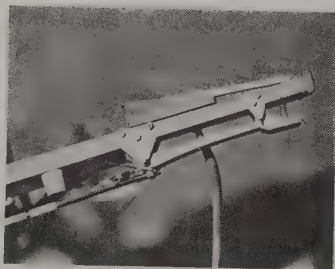
ing distance to the right they hit near the centre. Then I tried target arrows and to my astonishment found that while some of them went to the left many more went nearly straight, either hitting the target when the hunting arrows were passing to the left or missing to the right when the hunting arrows were hitting.

In the meantime something else was making its appearance which attracted my attention. The arrows, in passing over the block which held the bow, had begun to wear a groove, which showed their exact direction at the moment of leaving the bow and this groove was nothing else than the line from the bowstring to the side of the bow when in a state of rest, plus, of course, part of the width of the arrow. Sighting along this line pointed, as I have suggested before, to a spot fourteen feet or more to the left of the target according to how high the bow was strung.

Clearly then, some force was at work which gave the arrow a tendency to proceed in the original line of aim, when full drawn, and equally clearly this force could act only if the arrow bent around the bow while passing it.

I then reasoned that if an arrow so stiff that it could not be bent at all were shot from the bow it would follow, to the end of its course, the line from the resting string to the side of the bow. I therefore shot two of the rigid, heavy arrows used for hunting large game and found my prophecy to work out exactly, thus proving that an arrow which will not bend will go as far to the left as would be indicated by the height of the string, an arrow which will bend a little will go proportionally less far and an arrow of the flexibility of an ordinary 4.9 target arrow may even go straight.

I then took the bow out of the rest, shot it from my hand in the ordinary manner and found that all of the arrows went true to the target, though possibly the heavy arrows went a little farther to the right than the others, or exactly the opposite of what they had done in the vise. The only explanation



# SHOOTING MACHINES

HICKMAN'S  
KLOPSTEG'S

ARCHERS COMPANY'S

ELMER'S (1925)  
HICKMAN DETAIL





I can offer for this is that their greater inertia carried my bow-hand over further.

It then occurred to me that, as the stiffness of an arrow is in inverse relation to the strength of the bow, if I used a weaker bow those arrows which had been only fairly stiff for the fifty pound bow would be relatively very stiff for the weak one and would fly farther to the left. This was shown to be quite true.

Again I thought that if I used my strongest sixty pound Styles bow perhaps even the heaviest arrows might be made to bend and fly straight. This, too, was proven beyond doubt, for the arrows which had flown fourteen feet to the left now hit the target. However, the findings did not end there for the lighter arrows became like the good man who stands up so straight that he bends over backward; they actually flew far to the right of the direction of aim. Now all my life I had supposed that it was the arrows of weak spine that flicked to the left but here is proof that, at least when the bow is rigidly held, they go to the right, I repeat—to the R-I-G-H-T.

The worst was a sluggish arrow of beefwood, which went farther to the right than any other. Yet the astounding thing is that although the arrows go all ways under Heaven when the bow is held rigid, if the same bow and arrows be shot in the ordinary manner, as I have tried repeatedly, they will go nearly straight.

One most important point, with an extremely practical bearing on actual shooting, that was proven beyond any question, was what we may call bow-fatigue, or as it is often spoken of on the range: bow-tire. If the bow were so aimed that by shooting the arrow with ordinary movements the same arrow would fall consistently in, or near, the red, a very quick draw and release would send the arrow above the upper white, while a wait of a full minute would usually strike about the level of the lower black. In other words, as is well known in flight shooting, a bow loses a great deal of its cast in the first two

or three seconds. After that the loss, while continual, is progressively slower. The practical application of this lesson is not necessarily that one should act with haste but that he should act always with the same speed.

After having tested the rigidly held bow I tried the grip of sponge rubber, which would permit the bow to turn but not to shift to one side. The results were exactly the same, proving that the turn of the bow probably does not occur.

I then took out the bolt which held the front end of the arm and set that end on a flat board, placing rollers between to minimize friction. To my surprise the arrows still went as far as ever to the left. In these tests I used the very stiff hunting arrows, and the arm of the machine was set so delicately that the slightest touch of the finger would send it rolling to the right.

Fearing that the attachment of the bow, loose as it was, still prevented the correct action I removed it altogether and let the bow remain in place simply by its pressure against the end of the arm, falling to the ground when shot. Even this made no difference, the arrows uniformly going to the left.

I then thought that perhaps some factor of retention was present which I could not see, so I removed the arm from the stand and held it loosely in my hands like a crossbow. Same result to the left.

Just to check up again I here shot the arrows with my hands in the usual way and, also as usual, they went straight.

I now discarded the machine altogether and proceeded with a new device. I nailed a stick, firmly, crosswise on a tree at the height of my bow-hand and shot in the regular way except that I rested the right side of the bow against the end of the stick so that it could not be moved to the right by the arrow. Here all the factors of ordinary shooting were present with this single modification and the arrow went to the left, as much as when held in the vise. The importance of this lies in the fact that all theories which attempt to explain the Archers'

Paradox by the rotation of the string on the fingers, or other incidents of the loose, are wrong.

Thinking that it might be better if I rested the ball of my hand against the bar, instead of the bow, thus giving the effect of a slight pad, I shot a few arrows that way; but always the same flight to the left.

I then simply hooked the bow loosely over the bar, not touching anything but the string. It seemed to me that the maximum of freedom was thus produced, the bow falling each time, but the arrow still went to the left.

At this point in the experiments W. H. Palmer suggested that perhaps we unconsciously threw our bow-hand to one side or the other without being aware of it and that a further test might be made by attaching a rubber band to the unfastened bow, so that at the moment the cord was released from the trigger the bow would be pulled over to one side.

I tried this with great care, using strong traction first to the right and then to the left by a section of an automobile inner tube about half an inch wide. When the traction was made to the side the arrow was on, in this case to the left, the error was increased. When it was made to the right the error was slightly diminished but was not by any means corrected.

I then tried moving the bow out of the way before the arrow was discharged; by which I mean that I drew the bow, set the trigger, placed the arrow on the string ready to shoot and then carefully moved, or slid, the bow a little bit to the right, so as to leave a space between it and the arrow. Here at last I met with success for I found that if I set the bow away at a distance exactly equal to the diameter of the shaft the arrow would go as straight as though it were shot by hand, always supposing a stiff arrow to be used. If I set it less than this it went to the left with an error inversely proportional to the displacement. If I set it slightly more than the width of a shaft the arrow would go to the right, for example at two diameters it went to the right about four feet at sixty yards.

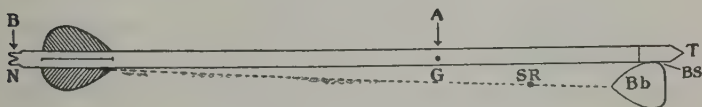
Yet it is easy to see that to this deflection toward the right there must be a limit which cannot be far away. To demonstrate this by its widest variation suppose the arrow were set so far from the bow that it stood out at exactly right angles from the plane of the cord and bow. Obviously it would then not go forward at all, except for perhaps a very few feet, but would simply be spun about like a weather vane or the arrow-shaped indicator of a child's toy. For every approach toward the true direction there would be a little more propulsion forward and a little less twist. Thus in actual practice when I set the head of the arrow fifteen inches from the side of the bow it was rotated in the same way but not so much and it fell to earth about twenty-five yards ahead and much to the left when the elevation was such that an arrow shot straight would have hit the target at sixty yards. At five inches from the bow the arrow was given a strong lateral impulse but the forward impulse was then so strong that the net result was seen in a very decided flirting with a veer to the left of what I might estimate as seven degrees. At four inches the flirt was markedly less and the direction better. At three inches there was no visible flirt and only a slight deviation to the left of perhaps one degree. At two inches it was so nearly straight that I could not tell what variation might be due to the set of the arrow and what to its unavoidable inaccuracy. In fact, between one and two inches the flight was so nearly true that I could not conscientiously draw a finer distinction. At a little less than one inch the arrow passed decidedly to the right, as I have said. Of the exact reason for this I am not certain and since the experimental findings have shown so many other theories to be fallacious I hesitate to hazard a guess in this case. At less than half an inch, or rather at exactly the width of the shaft, it flew straight, as I have mentioned, and beyond this point the arrow began again to fly to the left but for different reasons.

Rivetting my attention on my bow-hand, after this, while I

shot, I thought I could clearly discern the instantaneous flick to the right and back to normal as the arrow crossed the bow. The thicker the arrow the more noticeable it is. I even tried it with a shaft an inch thick. It is an experiment which I think you can all perform with profit.

To prove the pudding by the eating I went to the 100-yard range to shoot the heavy arrows. If I held with my arm as usual and my grip loose the arrow flew true. If I stiffened my arm and hand with particular attention to checking the least side play the arrow would fly several feet off the line of the target to the left. It is evidently for this same reason of allowing some freedom to the bow that those teachers of archery who insist on a very tight grip also insist on some relaxation of the elbow.

In my experiments the arrows did not fly quite so far to the left as they did for Dr. Pope. Five feet at 60 yards is 1 degree 30 minutes, 10 feet is 3 deg. 10 min., 12 feet is 3 deg. 50 min., and so on. I suppose the explanation lies in the fact that they used a hunting bow, which was probably wider than my target bow. In fact I have always felt that the best shooting could be done with a narrow bow and I think these experiments add weight to my opinion.



We must now attempt to explain why it is that an arrow which is thin enough to bend to exactly the right curve will go straight to the target, while one that is stiff will, as has been proven, go far to the left.

Assuming that we use a 28-inch arrow the centre of gravity will necessarily be about twelve inches from the tip, as Mc-Meen has mathematically proven and as anyone can discover for himself by balancing an arrow on his finger.



At full draw the position of the arrow and bow are represented in the diagram as: Bb=Bow Belly, Bs=Bow Side, Sr=String at Rest, G=Gravity, N=Nock, T=Tip. BbNT forms an angle which increases as N approaches Sr. Owing to the property of inertia anything which is set in motion will proceed in a straight line along its centre of gravity unless acted on by another force.

When the string is loosed at full draw the lines NBb and NT almost coincide and the arrow is started in the path of aim. Immediately, however, the angle BbNT begins to widen, T is forced more and more away from the line NBb and the force A is created, by the inertia, which presses against the centre of gravity. Evidently this would set up forces in the same direction against the string and bow, just as any arrow would do if it were held at both ends and pressed in the middle.

By shooting a thin metal tube I found that this force was sufficient to make a slight bend in it.

Inasmuch as only twelve inches of the arrow shaft lie in front of the centre of gravity while sixteen lie behind it, the angle BbNT is still very sharp when G is at Bs; in other words T has been pushed very little out of line.

Once past the bow, the centre of gravity, or G, tends to proceed in a straight line, and whereas by this time the gathered speed of the arrow is very great and is becoming still greater until the string comes to rest at Sr, and therefore its momentum is correspondingly great and continually increasing, the force A is sufficient either to bend the arrow over the bow as a fulcrum or else to press the bow out of the way. On the principle of the common lever the pressure against the bow is greatest when the string reaches Sr because then the short arm of the lever, in the arrow we are discussing, is about seven inches long while the long arm, or the distance from the centre of gravity to the bow (G to Bs) is nine inches. To put it more forcibly there are twenty-one inches of shaft in



front of the bow struggling to hold the shaft true and only seven inches trying to twist it aside.

We may therefore conclude, I think, that if an arrow is to fly straight from a rigid bow it must be of just such a stiffness, or of so much springiness, that it will bend to exactly the right amount. This explains the very great difficulty of finding even six arrows which are so exactly the same in elasticity and resiliency that they will find the same place in the target if the bow be immovable.

Now the last thing to consider is why a very limber arrow goes to the right. Here I can only surmise that we have to deal with buckling. The arrow is bent about the bow, as in the last case, but it is so weak that the pressure of the string is sufficient to augment the curvature, just as one can bend a light walking-stick by bearing too hard upon it. It is easy to see that an arrow which was curved with the concave side toward the bow would tend to fly to the right. In fact anyone can prove it for himself by shooting an ordinary arrow which has become warped. Sometimes, however, due to the inequalities of grain, an arrow will buckle in a very irregular manner and may fly almost anywhere.

When I got thus far in my experiments, in 1926, I was forced, by limitation of time, to stop and hand the manuscript to the publishers. After the volume appeared, a great many people rigged up shooting machines for the purpose of testing arrows, either to determine the individual variations within a set or to classify them for commercial distribution. Some were very good but others were, and still are, rather crude. A common mistake is to yield to the temptation of making the arrows fly true by eliminating factors that are inherent in the fundamental nature of shooting, as by stopping the bowstring with an interposed rod or even by shooting the arrows in a trough. Such tests are misleading and so worse than useless. The best apparatus that I have seen is Dr. Hickman's, which is so neatly contrived that it can be taken down

and put up again in a few minutes and may be packed in a small hand grip. A set of arrows that are nearly enough alike can be grouped pretty well by it up to sixty yards, but neither that machine nor any other that I have seen will do what the human hand will do: shoot the majority of arrows, selected at random, straight at the target without allowing for a throw to the left. As I have said, arrows that will go to the target with a straight aim, from a machine, must have exactly the right spine for the bow that is used; whereas in shooting by hand, some variation in spine is compensated for by a lateral movement of the archer's bow-hand.

I now feel pretty sure that the tendency to shoot to the left which is invariably manifested by a beginner, is partly due to the machine-like immobility of his bow-hand, and not entirely, as has been supposed, to such faults as drawing out of line and loosing by a pluck to the right. He has not yet acquired what most of us possess without being aware of it, an involuntary quiver of the bow-hand to the right at the moment of loosing.

If one would test for himself this habit unwittingly come by in practice, let him but shoot an arrow from the right side of the bow. In my own case it will be thrown off the target by ten feet or more at forty yards, although a short period of endeavor will enable me to correct or greatly modify the error by making voluntary pressure to the left. To be sure that the arrow is not thrown off by the pinching of the fingers or the rolling of the bowstring at the loose, the thumb draw can be used or the hand may be turned palm outward. For those archers who habitually draw with the thumb, the acquired throw of the hand will be toward the left.

Perfect graphical proof in all three dimensions of the excursion of the bow-hand is afforded by a method employed by Hickman at the suggestion of his colleague, K. D. Smith, of the Bell Laboratories, Inc. A six inch square slab of smooth modelers' clay, like a honeycomb in its frame, affixed

to a stand, is set by an assistant, just in front of and below the archer's hand and perpendicular to the bow at the moment of loosing. A sharp stylus, bent like a picture hook and driven in the bow, penetrating the clay to a depth of about one eighth inch, then marks the route taken by the hand when the cord is freed. It will show a push forward, as the backward pressure of the bow on the hand is released, a movement to the right and one back to the left with a drop downward. The reduction of pressure against the hand, Hickman says, amounts to as much as twenty to thirty percent. The forward motion happens before the arrow leaves the bow, as, also, does the motion toward the right. The motion to the left and downward occurs after the arrow has left the bow.

Dr. Hickman suggested that inasmuch as I had found the arrows to go straight from a machine if they were offset a certain distance from the bow, it would follow as a corollary that, in shooting by hand, the archers' paradox could be avoided by fitting the bow with a weak spring that would hold an arrow just so far away while aiming but would collapse against the bow at the slightest pressure during the loose. He made such a bow and tried it out in hand shooting, but when I saw him last I gathered that he had found it to be less accurate than the plain bow and had ceased to use it. Recently I made one for myself and shot it with great interest. The arrow rest was of cork and the spring was a splint of wood tied to the side of the bow on cork rests and free to swing at the lower end. The results were exactly in accord with those of all the other experiments. If an arrow were shot with the bow arm rigid or with the bow held against a wooden support, it would go straight if all adjustments were exactly correct; otherwise it would go a little to the right or to the left as in the case of the shooting machine. However, if I shot by hand, every arrow went uniformly to the right of the target, because, by thus adding the width of my involuntary flick to the distance already allowed between

the bow side and the arrow, I removed the normal contact which will be described later.

Now comes this thought to us, as it has to many others: why not smooth out all such vagaries of impulsion that annoy or fascinate archers of different temper, by boring a hole right through the middle of a bow and so shooting an unbending shaft straightly forth with no stress or strain except a good hard boost in the tail end? Who thought of it first, none can tell. Children's bows, themselves paradoxical because the body was stiff and the cord elastic, were made like that when I was young enough to be given one as a present. I have seen and handled an ancient German bow of unknown date, which had an iron handle of two sockets for the limbs and a large ring for the arrow to pass through. In 1879, Wright and Thorne, the men who patented the iron cored arrow, also patented just such a handle, with the addition of four screws, or pegs, intended to touch the arrow shaft and keep it in true centre. A picture of it can be seen in the catalogue of the contemporary firm of Orange Judd Company, of New York, now in the Boston Public Library. Quite recently the same idea has been vigorously pushed by another inventor who, though not previously an archer, was theoretically interested in the trickery of the paradox. With the enthusiasm of a pioneer, he spared nothing to produce the ultimate in centre-hole bows, using the finest materials and craftsmanship for both handles and limbs. The earlier patterns, though independently conceived, were almost exactly like the bow of '79 except that the two upper guides were omitted. Using only the two lower ones and shooting very light bows, a fair degree of accuracy was reached at short ranges. When stronger limbs were inserted, however, it was found that the arrow would not slide on its guides but would jump erratically about in the large hole, influenced by the many unlooked for strains and stresses that arise in the act of shooting. To steady the arrow, the right guide was

replaced by a vertical rod, against which the shaft bore as though it were the bow, and the whole affair was thus brought back to the principle of a bow with a deep notch cut in its side.

A more simple attempt to avoid the paradox is to shape a bow so that the string lies along the left edge, which is usually made flat. It is an old Indian trick and was adopted in their first bows by the United Bowmen of Philadelphia, though they soon discarded it for conventional types. In actual trial it will be found that the expected effect is nullified by the necessity of drawing the cord in opposition to the centre of the bow.

Some bows have been made with an offset in an iron handle, thus making a shelf on which to rest the arrow. George Nichols used one like that on the target with me in my first tournament of 1911, his father having had it before him. Like all such weapons, it shot to the right. In fact, I can honestly say that in my opinion no such schemes improve the accuracy of the bow. They are taken up enthusiastically by intelligent tyros and are even advocated by eminent physicists who do not give sufficient importance in their calculations to the human elements of archery. Sooner or later the faults of the gadgets overshadow their virtues and the archer goes back to his simple first love.

That the arrow actually does bend to a considerable extent in hand shooting, was well proven by moving pictures taken of W. H. Palmer by Dr. George U. Pillmore of Haverford, Pa. They were made at Palmer's home and the lens was directed both from the ground and, more importantly, from the top of a low water tower. The films were kindly given to me and I picked out of them forty-five views of the arrow crossing the bow. As the speed of exposure was one hundred and twenty-eight frames per second, there were usually two or three views of each arrow in its passage. Furthermore, the series of movements could be completed by comparing



arrows that were caught in different phases. Palmer had won the championship of 1928 but a few days before and, as the pictures proved, was shooting in impeccable form.

The first thing that is seen is a decided bend of the whole shaft of the arrow with the convexity toward the right, this being caused by the squeeze between the string and side of the bow acting on the inertia of the arrow. The wood then straightens itself more quickly than it is propelled and, as the tip is tending to proceed as nearly as it can in the original line of aim, the shaft bends to a curve in the opposite direction, with the convexity toward the left, to pass around the bow. As the string nears its point of rest this flexion becomes very marked in the rear portion of the stele, as it is bent against the bow, thus putting the wood in so great a condition of strain that as soon as it is relieved from the restraint of the cord in the nock it springs well out to the left, quite clear of the bow.

Examining the films under a microscope, I found that, at the commencement of stress, the front end of the shaft impinged tightly against the bow, as would naturally be the case with the shaft curving as has just been described. Then, as it bent the other way, it rode clear of the bow well past the centre of gravity to a point in front of the shaftmond where it seemed to bounce and then instantly press again very forcibly against the bow side until the nock was disengaged. This is where we find the paint worn off our arrows. The shaftmond then sprang away from the bow, even clearing the feathers.

One of the arrows was a flirt. In it, or her, the elasticity of the wood was not sufficient to straighten it out faster than it was propelled forward by the string. It therefore remained bent in its right sided convexity and skidded off to the left before it could find itself, thus demonstrating, I think, the real meaning of inadequate spine.

The movement of the bow-hand is absolutely proven by at least one exposure which shows two hazy bows and bow-





MOVIES OF THE ARCHERS' PARADOX



hands, the former not only side by side but one in advance of the other. The hazier hand, which I take to indicate the limit of motion, is a finger breadth in front, as we should expect it to be because of its sudden relief from the backward pressure of the bow. I also verified the true hand by laying a straight edge along the film and lining it with the other hands. The quickness of the act is demonstrated by the fact that in the next exposure the bow is nearly distinct and in the second is quite so.

That the string passes by its momentum beyond the normal point of rest and then vibrates back behind it, is clearly shown. That does not seem strange to us who know the twang of a strong bow, but I record the fact especially because a professor of physics in a near-by college once wrote to me asserting that there should be no twang to a bowstring, theoretically, because of the dampening effect of the arrow. Also, another physicist based important deductions on the same assumption, which seems to be deceptive enough to warrant denial. Just how much the string was drawn laterally by the swing of the arrow I could not see, though more accurate methods of measurement might discover it.

In this connection, Hickman says that he once used a heavy wire string which, even at a six inch bend, would almost touch the bow by its momentum, rebending the tips until it sprang out of the nocks. A very heavy string will sometimes go forward in the arrow nock till it breaks off the right side of the nock by its pressure. This fact, that the heavy string causes a greater terminal deflection of the shaftmond, is the best argument that I know of for a light string and, I think, is one that has never before been presented in print.

The views from behind of arrows in flight immediately after quitting the bow, showed that they took both a spring and a wobble in a diagonal direction from lower right to upper left. This makes one wonder if, in addition to the throw to the left of the shaftmond, there be not also an upward thrust

over the hand. I examined very carefully all of the pictures that were taken on the level from the side and, while most of them looked straight, I found at least one that had a curve with the convexity upward, as was evident both by eye and straight edge. Perhaps in the others, maybe of stiffer spine, the pressure was taken up by the softness of the hand. At any rate such a force must exist, for in every instance the middle of the shaft lay flat to the hand while the shaftmond rode clear above it. This, I think, accounts for the vertical force which combines with the lateral to produce the diagonal motion of a recently freed arrow.

The next two or three views of the same arrows show how they return to a normal straight course toward the target, for, while an arrow is distinctly shown, it is going so fast that it looks drawn out in length and so its movements can be followed. At first the point bears a little to the upper left, with the white feathers making a track like a curved tail. Then the arrow turns right and immediately left, some elongated shafts even making the illusion of a sinuous curve. If there were some more wobbling after this, as is probable, the arrow was too far away for me to see it.

As I said before, the arrows were perfectly shot by an expert archer. From incompetent hands they might do almost anything.

These results were independently verified and added to by E. S. Hodgson, D.D.S., of East St. Louis, who conducted an extraordinarily able investigation by means of a shooting machine and published his findings in *The Archery Review*, for April, 1932. To simulate hand shooting as closely as possible, he put the bow to the right of the supporting arm, as it is naturally held by a right handed archer, and made the trigger fingers to close toward the left. A twenty-seven inch arrow was used.

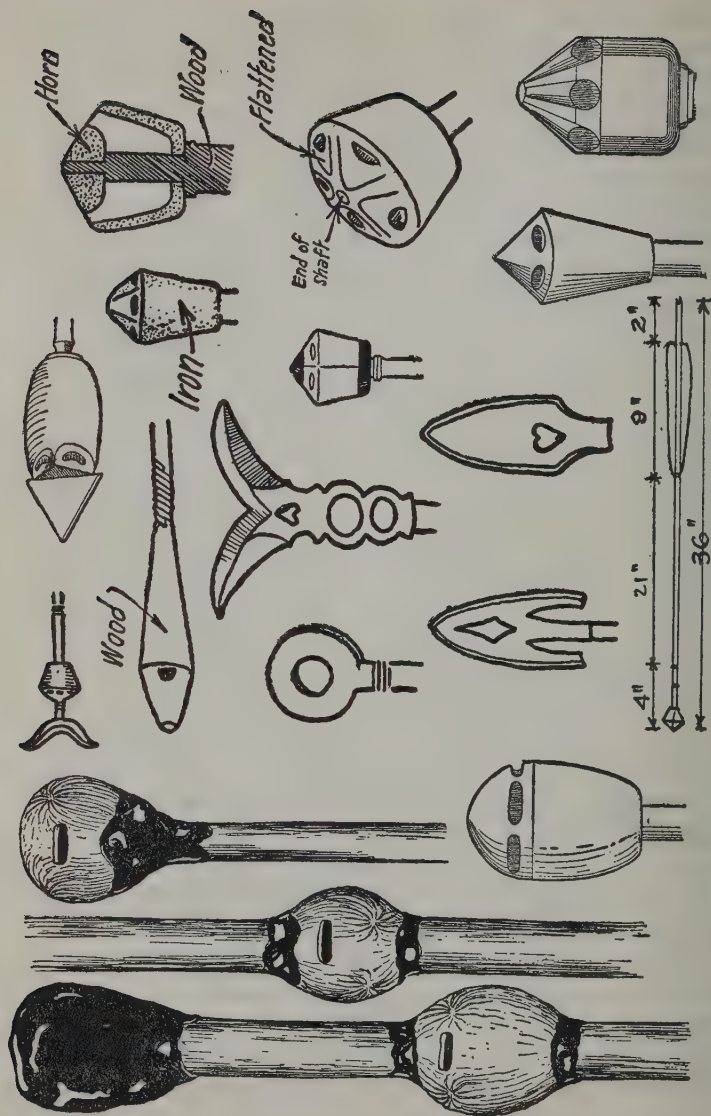
To trace the course of the nocking point of the string, he daubed paint just below it and then set a little, transverse,

hinged rod across its path, or, rather, across the path of the paint, changing the position of this rod in repeated trials until it had stood at every quarter inch of way. Plotting on paper the curve indicated by the points of impact on the rod in its different positions, he found the string to move first to the left, being half an inch away at two inches. Here I must wonder if this would have occurred if the trigger fingers had moved with the string instead of against it. At five inches the string crossed the line of aim and then swung in a long curve on the right side, being more than an inch away at fifteen inches from its starting point, or one foot from the back of the bow. Swinging in to its point of rest it did not stop there but continued by its momentum for more than an inch, at the same time being drawn left, by the arrow nock, to the line of aim. Here it was freed of the shaft, sprang a little in toward its true line, then vibrated backward and hit the side of the arm with a sharp slap. This phenomenon can also be demonstrated on a bracer in shooting by hand, the string making two marks, one where it releases the arrow and the other back of that and also posterior to the point of rest; probably because the bow tips do not move away so fast as the handle does and therefore they pull over the string.

The doctor also noticed the same contact between arrow and bow as was shown by our pictures. I may add that I have shot arrows past a crayon, tied as an arrow plate to the bow, with the like result: three or four inches of color, then clear to the feathers, then a spot and a dash and then clear again.

By shooting an arrow through paper screens set at various lengths, the doctor obtained cuts or tears in them which showed the same diagonal wobbling and the same course of the shaft in flight as appeared in the pictures.

A pleasant and almost untrodden way of experimentation in trajectories is through the sound of whistling arrows. These curious missiles are almost world wide in their in-



Whistling Arrows.



digenous distribution. Old specimens have been discovered in the graves of the Siberian iron age. Formerly they were used by all the Turkish nations of central Asia. The Kalmuks on the Volga, as well as many Siberian tribes, still make use of them. In China they were shot at obtrusive people by the imperial guard. Some with iron points stuck in them were for hunting. In parts of Brazil they are used for playing games. In Tibet they must have a utilitarian purpose as they are tipped with flint. In old England they seem to have been for amusement and possibly for signalling, especially at night.

All are made on the same general principle, having a hollow ovoid whistle usually placed as a tip but sometimes, especially on the long Brazilian arrows, set far back on the shaft, which is stuck through them. The English ones were made of horn, the Asiatic are of bone, horn, vegetable ivory or iron, the Tibetan of carved wood and the Brazilian of palm nuts. I have made them of celluloid balls. About as relatively far from the front end as the arctic circle is from the north pole are from one to five fenestra, or slits, wider than deep, which function like the blow hole of a flute. They give forth a rough, hoarse, spooky sort of whistle which is never very loud but whose intensity naturally varies with the speed of the arrow and whose pitch rises or falls as the shaft be coming or going.

Disregarding the pitch, we find that if one be shot nearly on a level it will keep a fairly even tone. If it be shot straight up, the sound will get fainter and fainter until it dies out, then, as the arrow turns and drops to earth, the whistling will start again and increase with the speed of the falling shaft. Of course an arrow, however shot, must always go a few feet before the musical chamber "fills," as we who play the flute call the sounding. What is most interesting is a fact which applies as well to any other projectile that is shot in a high trajectory and yet which seems to have been unnoticed by

some army officers with whom I have talked, namely, that the arrow, or other projectile, is going much faster when it lands than when it is on its way high in the air. Thus the sound of a whistling arrow which is shot at forty-five degrees will become very faint at the peak of flight, when the initial driving force is no longer able to lift the weight of the arrow, and then will increase rapidly as the shaft slopes downward to its mark under the added acceleration due to gravity.

Solid heads of various shapes, if they be perforated, will also make a sound, though it is fainter, more buzzing and less musical.

Manna from above fell on us hungering and distraught empiricists when Clarence N. Hickman, Ph.D., sometime of the U. S. Bureau of Standards and now of the research laboratories of the American Telegraph and Telephone Company, answered our prayers for help by applying his highly trained mind to the relief of our needs. In a series of masterly articles, printed in *Ye Sylvan Archer* and never previously equalled by toxophilic investigators, he discussed by theoretical equations and from data won experimentally with his shooting machine, most of the problems of the bow when it is static, or motionless in different attitudes. Papers on the dynamics of the bow, which may be even more valuable, are not yet available for this volume. Here I can only comment on some of his results, hoping that his completed investigations will eventually be published in book form.

His shooting machine, previously mentioned, was said by him to practically duplicate the conditions obtained in shooting by hand. To my mind this is hardly so, for instance, the string is not free to swing far to the right because it runs close to the left side of the supporting arm. Yet it is good enough and in one particular is unique: It is furnished with a series of electrical contacts, placed six inches apart, which are closed by a silver pin on the passing arrow and are attached to a chronograph which records intervals as small as

.00005 seconds. It measures the changing rates of velocity in an arrow with an accuracy better than one percent.

Unless otherwise stated, he considered the bow to be six feet in length, with a rigid eight inch centre, perfectly straight when at rest and with limbs that would bend in the arc of a circle when drawn.

Taking things as they come, we are told of the string that its tension is highest when at rest, decreases as the bow is drawn, to a minimum at less than half the draw, and then rises until it nearly regains the original mark. For example, a sixty pound initial tension might sink to forty-five pounds at fifteen inches and rise to fifty-three at twenty-eight. However, the string tension is much less for short bows than for long ones and is then highest at the last of the draw, thus, for a five foot bow of the same weight the poundages might be only 42, 32 and 45. I tested a sixty-eight inch, forty-six pound Styles bow for this factor by putting a spring scale in the string and found that it ran from 38 to 48.

As to the weight of the string; any addition has about as much retarding influence on the velocity of its arrow as if one-third of that increase were added to the arrow itself. This is readily comprehended when one thinks that the middle third of the string moves closely with the arrow, while the end thirds do not affect it much. A practical lesson from this is that while one should whip the centre very lightly, he need not try to make the loops light nor hesitate to cover them well.

The fact that weight at the ends of the bow, as of string loops or bow horns, does not have much inhibiting effect, was worked out by loading the tips of a bow with brass screws and nuts. Even a maximum load of 185 grains on each end, or 370 for the bow, reduced the speed of the arrow by only one foot per second. Ordinary horn tips, which weigh only a few grains, are negligible, in spite of all that has been said to the contrary, and even the dead weight of the rigid ears of

composite bows is no great detriment if they be not too long. The resistance of air against the tips is also without appreciable effect, as even cardboard discs of four square inch area, fastened at the ends, reduced the shaft velocity by only two feet per second.

The effects of different bracings were investigated by using heights that varied from zero to nine and a half inches. A curious fact was proven: that when full draw is more than twenty-two inches the weight at that point is always the same, no matter how high the initial bend may be. I have often thought that this was true, empirically from the feel of the string and by trying the weight-draw with a spring scale, but here it was proven by pure mathematics. What then, we ask, should govern the height? The answer is twofold; the fibre stress and the casting power.

Knowing that to break a stick one need but bend it enough, we are not surprised to find that the higher the bow is braced, the greater is the fibre stress within it. Therefore, too high a bend is more distressing from first to last and, if exaggerated, will result in a broken bow. More pleasingly, the work done by the archer in drawing a bow with a very high bend is much less than if the bend were low, but, in retaliation for this indulgence, the cast is not so good. To anyone, the extremes of bracing are obvious, for while a bend of zero, or of no deviation from rectitude, yields a poor cast, a bend of the full length of the arrow would permit no cast at all, as the string could not move. By computation, the best heights, when measured from the centre of the handle and not from its back, were found to be five inches for a sixty-four inch bow and seven inches for one of six feet. These, of course, were figured for cast only, omitting the utilitarian desideratum of a higher bend that would give less of a paradox. From purely empirical findings, I prefer about seven and a half inches from the centre of the bow, while Professor Rendtorff once wrote me that he used nine. Roger Ascham's

"shaftmond and two fingers" measures about seven and a half inches on my hands, but I suppose that his bow was longer and that he measured from its belly, as we all do on the field.

A set, or following, in a bow, and the reverse condition of a reflex, influence the string tension as one would expect them to do if he considered that the set bow does not have to bend so far for the bracing as the reflexed bow does and therefore will be under much less strain. What is not obvious, but is ably shown by the doctor's graphs, or plotted curves, is that while the initial tension may vary from, let us say, eight pounds in a deeply set bow to seventy-nine in one with equivalent reflex, yet the tension in both of them, and in the strings of all bows of intermediate shapes if they be of the same weight, becomes the same at full draw. This seems to me to be good evidence from the theoretical side of one of the reasons for the wonderful cast of the Oriental composites; no harder to draw and yet so tight of cord at the end. The string tension must not, however, be confused in our minds with the resiliency of the bow, as short bows will shoot further than long ones of the same pattern even though their string tension be less.

The work done in drawing a reflexed bow is greater than for a straight bow, which, in turn, bears a similar relation to a set bow. It therefore appears that the reflexed bow has more potential energy for the same holding force than have the other two kinds, especially the latter, which is bent by toil. In fact one can show empirically that the belly of a set bow is not as strong as when it was young and straight, for a strip of it sawn off lengthwise will own that it has been strained beyond its elastic limit by curling up in distress.

Since nothing concerns the bowyer more than the design of his product, calculations were made to determine the value of several fundamental shapes, one of which may predominate in an actual bow, but which must often be more or less combined.



Rectangular cross sections were considered first and of these the simplest was the slat bow, or bow of uniform section for its whole length. Common experience, so primitive as to be confused with intuition, has taught us that we can break such a stick over our knee by pressing down on its ends. Mathematics shows the same thing; the stresses are greatest in the middle, most of the flexion comes there, and the rest of the limb bends very little. Such a bow is of no worth.

Each limb of the second form was wedge shaped, being of the same width throughout but varying in thickness, by straight lines, from a maximum base to an edged tip. In this design there is too much wood at the bottom, or handle, and too little near the tip so that, by calculation, it is shown to bend to infinity at the end. Practically, this would make an extremely whip ended bow, whose tips would bend way over at right angles and whose cast would be very poor.

Since the slat bends in the middle and the wedge bends at the tips, there must be a shape between them, still of uniform width, that will bend in the arc of a circle. This was found to be one whose tapering curve is expressed by the formula:  $t = T \sqrt[3]{\frac{x}{L}}$ , where  $t$ —represents the variable thickness,  $T$ —the thickness at the base,  $x$ —the distance of the required point from the loaded end, and  $L$ —the total length. In practical bowery, the curve must be taken off the belly side only, but the formula remains the same as if both sides were worked.

For an easily understood example, let us consider a billet one inch square and thirty inches long. Then at every three inches, or one tenth of its length, the actual thickness would be, from the handle out: Base—1., .1—.9655, .2—.9283, .3—.8879, .4—.8434, .5—.7937, .6—.7368, .7—.6694, .8—.5848, .9—.4642, 1.—0. The lesson to be learned from these figures is that inasmuch as the reduction of wood in three inches is measured by a few hundredths of an inch, the figures themselves, in such an organic material, can be only a general guide and the actual result must be obtained chiefly by the eye and



the tiller. We are impressed at once by a fact that is usually learned by long and expensive experience: that wood must be taken off in almost microscopical shavings in order not to inadvertently create a weak spot.

While an arc is a desirable form in bows, this form is faulty in that the fibre stress is unevenly distributed, being greater at the base, and hence all parts do not work to the same efficiency. However, nearly all bows in practice, especially of the conventional type, contain some of this element of increasing thickness toward the handle.

In the fourth and best design, for rectangular sections, the thickness is uniform but the taper is made in the width, by straight lines, from the base to a pointed tip. This also bends in a true arc, no matter what the central width may be, a fact which was newly discovered by Dr. Hickman during these investigations and should be of wide application in other arts than bowery. Anyone can prove it by cutting a piece of stiff paper in any width at the centre but tapering to points at each end and then pressing it between finger and thumb. It is an excellent shape, as it works every part of the bow equally and gives the same fibre stress at all points. Of course a bow cannot taper to an exact point, or edge, but practically it can be left wide enough near the end to avoid side twist.

After all, the question of fibre stress has more than anything else to do with determining the shape of bow that will give the best cast. In the past, every known bow, except some by American Indians, has been of other than rectangular section and so it is well to know the value of the commoner rounded forms. The first thing to find, in this quest, is the plane of neutral bending, which Hickman defines as "a thin section between belly and back which is neither stretched nor compressed." In rectangular bows it is in the middle. In fact, no matter what the shape, we can say roughly that there is about as much wood in front of the plane as behind it. Bows of the conventional pattern usually have the sides parallel for a

short distance from the back and are then rounded off into any curve which suits the bowyer's taste, one sometimes merging into another. Typically, they may be rounded conservatively in the arc of a circle, narrowed in a parabola, or even flattened a bit in a hyperbola. In each of these cases the neutral plane moves back from where it would be in a rectangular section about as far as the eye would suggest, always allowing as much wood in front as behind. Thus, the distance to the back is less than that to the belly by 20% in the Roman arch, 30% in the parabola and an even greater percentage in the hyperbola. Fortunately, there is an easy and exact method for determining the position of the plane in any section of a bow that is laterally symmetrical. By cutting a piece of paper to the shape of the cross section at the point desired, marking a line across the middle of it from belly to back and then sticking a pin in that line at different points until the paper balances in all directions, one will find the centre of gravity, which is always in the neutral plane. In practical bowery one can make sure in this way, by numerous paper sections, that the neutral plane is straight and in the same relative position, rather than crinkled up by a changing ratio of the stresses.

These considerations apply exactly only to bows of homogeneous structure throughout. If a wooden belly be restrained in a back of ribbon steel with a cap on each end, as has been done, the wood can do nothing but compress and the neutral plane will be between it and the steel. If the backing be of a material that is weakly elastic, it will not draw the neutral plane much toward it. Practically, most bow woods are sufficiently homogeneous to make the rules applicable.

Since the fibre stress is proportional to the distance from the neutral plane of bending, it is therefore greatest at the back or belly of the bow; in sagittally symmetrical bows the same at either, but in non-symmetrical bows preponderant in one or the other according to the ratio of difference. Thus, any transversely curving contour that puts the plane nearer to the back

will throw a proportionally greater strain on the belly. This is not obvious because the stress is one of compression, or crushing, but it is shown by most bows of conventional type in their following of the string. A stacked belly, therefore, will give way before the back does but, in consequence, the neutral plane is shifted forward until the stretching stress in the back becomes excessive and it splits transversely. It will be noticed, in actuality, that a bow that breaks crosswise always does so from the back, in this very manner, the stresses being sometimes so widely distributed that it is fractured into a dozen pieces.

It should be understood that while the plane of neutral bending is neither stretched nor compressed, for that very reason it is under the greatest shearing strain of any part of the bow. On one side the wood is pulled and on the other it is pushed, like two boards being slidden on each other with the air-space between corresponding to the plane. In fact it is for the relief afforded by this very freedom of motion that the laboring bow is seeking and often it will split longitudinally along the neutral plane to gain it. For that reason it is quite correct to call the plane of neutral bending the plane of maximum shear.

Bows of symmetrical section, such as rectangular, round or elliptic, can therefore be made heavier than stacked ones without danger of disruption, a fact which may have something to do with the nearly round shape of the ancient English bows, the cast of 247 yards with heavy hunting arrows which Pope observed in the round Wassukuma bows, and the elliptic section of composite bows, though in them the conditions are modified by the different elasticity of horn and sinew.

Hickman figured that in a yew bow by a well-known maker, the compression stress at a point where it had followed the string was 68% greater than at one nearer the handle where it had remained straight. A bow of this kind, therefore, does not work equally at all points, the thick parts being lazy.

To put these engaging theories to material test, more than a

dozen experimental bows were built by Paul E. Klopsteg, Ph.D., of Evanston, Ill., who is not only a good archer but is a physicist of the highest standing. During the war he was internationally known by his work in ballistics, one of his "war babies" being the Aberdeen chronograph, which he uses for velocity tests and from which Hickman evolved his modification. Choosing the fourth type, of uniform thickness and straight sloping sides, as the best, he found that but few changes were required to make it a practical weapon. As the handle was to be rigid, he made it deep, narrow and only six inches long, sloping it gracefully but abruptly into the limbs. Cutting the upper limb a little longer, as is customary but is by no means universally approved, he secured sweetness, or concurrent recoil with equal momentum, by scraping it a trifle thinner. Near the ends he left the width at least equal to the depth, to prevent twisting, and from there on made use of the third type of design, of equal width and convexly reduced belly, in order to retain the true arc.

As typical dimensions, the total length was five feet six inches, more or less, the greatest width about one and seven-eighths inches, the least about a half inch and the thickness about five-eighths, all subject to slight variation.

Testing bows of both yew and osage against others of the same materials, length and weight but of conventional design, he found the efficiency in all cases to be greater for the new type, usually in the ratios of six or seven to eight; for instance, 63% for a conventional yew as against 82.7% for the flat yew. By taking three inches more off the length, still greater efficiency was obtained, with safety.

## XVI

### CHAMPION ARCHERS OF THE UNITED STATES

#### MEN

1879 to 1910. The winner of the Double York Round.

The new constitution authorized in 1910 provided for two equal championships, beginning in 1911, which were won as follows:

<i>York Round Championship</i>		<i>American Round Championship</i>	
1911 H. S. Taylor	181- 835	R. P. Elmer	175-1041
1912 G. P. Bryant	230-1094	G. P. Bryant	177-1153
1913 J. W. Doughty	178- 802	R. P. Elmer	170-1000
1914 R. P. Elmer	162- 764	R. P. Elmer	176-1052

While this plan, for the first time, brought out the real importance of the American Round, it was too indecisive to give general satisfaction. In 1914, therefore, the N. A. A. voted to award the championship on the basis of hits and scores for both double rounds, combined in one total.

1915 R. P. Elmer	2012	1923 W. H. Palmer, Jr.	2200
1916 R. P. Elmer	2468	1924 J. S. Jiles	2258
1917 R. P. Elmer	Default	1925 P. W. Crouch	2496
1918 R. P. Elmer	Default	1926 S. F. Spencer	2474
1919 R. P. Elmer	2560	1927 P. W. Crouch	2554
1920 R. P. Elmer	2278	1928 W. H. Palmer, Jr.	2608
1921 J. S. Jiles	2160	1929 E. K. Roberts	3038
1922 R. P. Elmer	2488	1930 R. Hoogerhyde	2938

As, by this time, most archers believed that hits should not be counted, a new ruling to that effect governed the subsequent tournaments, the championship being awarded on the combined scores of the two double rounds.

1931 R. Hoogerhyde	2476	1932 R. Hoogerhyde	2676
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## WOMEN

1879 & 1880. The winner of the Double Columbia Round.

1881-1910. The winner of the Double National Round.

By the constitution which took effect in 1911 there were created two championships of equal rank.

*National Round Championship*

1911	Mrs. J. H. Taylor	94-396
1912	Mrs. J. H. Taylor	112-524
1913	Mrs. P. S. Fletcher	93-377
1914	Mrs. B. P. Gray	127-625

*Columbia Round Championship*

Mrs. J. H. Taylor	131-731
Mrs. J. H. Taylor	131-787
Mrs. L. C. Smith	116-574
Mrs. B. P. Gray	143-839

As with the men, a single championship was henceforth awarded on the basis of the total hits and scores for both double rounds.

1915	Miss C. M. Wesson	1980	1923	Miss N. L. Pierce	1142
1916	Miss C. M. Wesson	1692	1924	Miss D. D. Smith	1616
1917	Miss C. M. Wesson	Default	1925	Miss D. D. Smith	1682
1918	Miss C. M. Wesson	Default	1926	Miss D. D. Smith	1750
1919	Miss D. D. Smith	1624	1927	Mrs. Rob't Johnson	1860
1920	Miss C. M. Wesson	1660	1928	Mrs. B. Hodgson	1756
1921	Miss D. D. Smith	1526	1929	Mrs. A. Grubbs	1832
1922	Miss D. D. Smith	1616	1930	Mrs. A. Grubbs	1866

Hits were no longer counted, the championship being granted for the highest total score of the two double rounds.

1931 Mrs. D. D. (Smith) Cummings 1824 1932 Miss Ilda Hanchette 1755

It is interesting to compare the standing of the champions since 1883, when the American round was introduced, on the basis which is in use to-day, of adding the scores of both major rounds. Those who won the York round, in the years from 1883 to 1914, in many instances, would not have won the championship under the present system, but there is nothing to be gained by hunting out those hypothetical cases. I am therefore giving only the best year for each man who was an actual champion.



## CHAMPION ARCHERS OF THE U. S. 477

1. 1932 Hoogerhyde	2676	11. 1908 Thompson	1832
2. 1929 Roberts	2601	12. 1886 W. A. Clark	1815
3. 1926 Spencer	2297	13. 1900 A. R. Clark	1783
4. 1912 G. P. Bryant	2247	14. 1911 Taylor	1775
5. 1928 Palmer	2211	15. 1892 Maxson	1763
6. 1910 Richardson	2170	16. 1895 Robinson	1708
7. 1919 Elmer	2163	17. 1913 Doughty	1650
8. 1927 Crouch	2155	18. 1903 W. Bryant	1485
9. 1885 Williams	2050	19. 1899 Howell	1395
10. 1924 Jiles	1915	20. 1896 McGowan	1249

Similarly, the women champions would stand as follows:

1. 1931 Mrs. Cummings	1854	10. 1910 Miss Sullivan	1338
2. 1932 Miss Hanchette	1755	11. 1913 Mrs. Taylor	1311
3. 1895 Mrs. Howell	1725	12. 1909 Miss Case	1309
4. 1915 Miss Wesson	1706	13. 1897 Mrs. Barker	1267
5. 1889 Miss Phillips	1658	14. 1894 Mrs. Kern	1240
6. 1930 Mrs. Grubbs	1596	15. 1913 Mrs. Fletcher	963
7. 1927 Mrs. Johnson	1584	16. 1923 Miss Peirce	945
8. 1914 Mrs. Gray	1464	17. 1901 Mrs. Woodruff	918
9. 1928 Mrs. Hodgson	1461		

## HIGHEST OFFICIAL AMERICAN RECORDS

### MADE IN OPEN TOURNAMENTS SANCTIONED BY THE N. A. A.

#### MEN

##### Single York Round

125-703 Dr. E. K. Roberts June 7, 1931 Ventura, Calif.  
Annual Championship Tournament, Ventura Archery Club

##### Double York Round

244-1398 Dr. E. K. Roberts June 6-7, 1931 Ventura, Calif.  
Annual Championship Tournament, Ventura Archery Club

##### Single American Round

90-704 Clinton W. Douglas Dec. 27, 1928 San Pedro, Calif.  
First Tournament, Terminal Island Playground

##### Double American Round

180-1380 Russell Hoogerhyde July 28, 1932 Seattle, Wash.  
Annual Tournament, National Archery Association

##### Team Round

94-648 E. Mould May 17, 1930 Santa Barbara, Calif.  
Tournament, Santa Barbara Archery Club

##### Team

380-2388 San. Bar. Arch. Club May 17, 1930 Santa Barbara, Calif.  
Mould-648, Roberts-622, Douglas-592, Lawhorne-526.  
Tournament, Santa Barbara Archery Club

##### Single Metropolitan Round

141-807 Carl G. Thompson Sept. 24, 1932 Scarsdale, N. Y.  
Annual Championship Tournament, Metropolitan Archery Association

## Double Metropolitan Round

279-1753 Carl G. Thompson Sept. 24-25, 1932 Scarsdale, N. Y.  
Annual Championship Tournament, Metropolitan Archery Association

## Single Hereford Round

136- 710 Dr. P. W. Crouch Sep. 28-29, 1929 Scarsdale, N. Y.  
Fall Tournament, Metropolitan Archery Association

## Double Hereford Round

249-1345 Shirley Peterson Sep. 26-27, 1932 Seattle, Wash.  
Annual Tournament, National Archery Association

## Saint George's Round

96- 526 Carl G. Thompson June 1, 1930 Westport, Ct.  
Open Tournament, Metropolitan Archery Association

## Potomac Round

64- 324 Russell Hoogerhyde Nov. 10, 1929 Washington, D. C.  
Autumn Tournament, Potomac Archers

## Jersey Round

126- 812 Wilmer Abbey Sept. 21, 1930 Rahway, N. J.  
Annual Championship Tour., New Jersey State Archery Association

## Flight Shoot

466 yds. 10½ ins. Homer Prouty July 26, 1931 Portland, Ore.  
Annual Championship Tournament, Western Archery Association

## WOMEN

## Single National Round

71- 455 Dorothy Duggan Sept. 11, 1931 Storrs, Ct.  
Annual Championship Tour., Connecticut State Archery Association

## Double National Round

139- 847 Mrs. D. S. Cummings Aug. 11, 1931 Canandaigua, N. Y.  
Annual Tournament, National Archery Association

## Single Columbia Round

72- 538 Mrs. Wilmer Graeber July 4, 1932 Buffalo, N. Y.  
72- 538 Dorothy Duggan Aug. 6, 1932 Worcester, Mass.  
Annual Championship Tour., Worcester Archery Club

## Double Columbia Round

144-1052 Mrs. Josephine Taylor Sept. 25, 1932 Washington, D. C.  
Fall Tournament, Potomac Archers

## Team Round

96- 624 Gertrude Roach August 14, 1931 Canandaigua, N. Y.  
Annual Tournament, National Archery Association

## Team

363-2031 Los Angeles Archers July 29, 1932 Seattle, Wash.  
Little-573, Armstrong-565, Seay-476, Hunt-417  
Annual Tournament, National Archery Association

## Single Metropolitan Round

119- 807 Dorothy Duggan Sept. 26-27, 1931 Scarsdale, N. Y.  
Annual Championship Tour., Metropolitan Archery Association

## Double Metropolitan Round

239-1561 Dorothy Duggan Sept. 26-27, 1931 Scarsdale, N. Y.  
Annual Championship Tour., Metropolitan Archery Association

## CHAMPION ARCHERS OF THE U. S. 479

### Jersey Round

127- 713 Mrs. W. Reekie (née Duff) Sept. 21, 1930 Rahway, N. J.  
Annual Champ. Tour., New Jersey State Archery Association

### Flight Shoot

346 yards 4 inches Mrs. Homer Prouty July 4, 1931 Corvallis, Oregon  
Annual Champ. Tour., Oregon State Archery Association

## INTERMEDIATES

### Single American Round

89- 579 Jack Selby July 30-Aug. 2, 1929 Santa Barbara, Calif.  
Annual Tournament, National Archery Association

### Double American Round

177-1137 Jack Selby May 30-June 1, 1930 Sacramento, Calif.  
Annual Championship Tournament, Western Archery Association

### Single Metropolitan Round (Men's)

124- 702 Jack Selby May 30-June 1, 1930 Sacramento, Calif.  
Annual Championship Tournament, Western Archery Association

### Double Metropolitan Round (Men's)

241-1391 Jack Selby May 30-June 1, 1930 Sacramento, Calif.  
Annual Championship Tournament, Western Archery Association

### Single Hereford Round

131- 697 Shirley Peterson July 26, 1932 Seattle, Wash.  
Annual Tournament, National Archery Association

### Double Hereford Round

249-1345 Shirley Peterson July 26-27, 1932 Seattle, Wash.  
Annual Tournament, National Archery Association

## BOYS

### Single Junior American Round

89- 643 John Hobson July 27, 1932 Seattle, Wash.  
Annual Tournament, National Archery Association

### Double Junior American Round

178-1244 Brownell McGrew, Jr. July 30-Aug. 2, 1929 Santa Bar., Cal.  
Annual Tournament, National Archery Association

### Single Junior Metropolitan Round

116- 768 Dean Thomas June 28, 1931 Maplewood, Mo.  
Annual Open Tournament, Maplewood Archery Club

### Double Junior Metropolitan Round

231-1483 Dean Thomas June 28, 1931 Maplewood, Mo.  
Annual Open Tournament, Maplewood Archery Club

## GIRLS

### Single Junior Columbia Round

72- 538 Madaline Taylor Aug. 11, 1931 Canandaigua, N. Y.  
Annual Tournament, National Archery Association

### Double Junior Columbia Round

143-1059 Madaline Taylor Aug. 11-12, 1931 Canandaigua, N. Y.  
Annual Tournament, National Archery Association

# HIGHEST RECORDS OF THE NATIONAL ARCHERY ASSOCIATION

## MEN

Single York Round	126- 696	Russell Hoogerhyde	1932
Double York Round	244-1296	Russell Hoogerhyde	1932
Single American Round	90- 698	Russell Hoogerhyde	1931
Double American Round	180-1380	Russell Hoogerhyde	1932
Team Round	95- 645	Dr. E. K. Roberts	1929
Team	376-2268	Santa Monica Archery Club	1929
		Douglas 600	
		Goulet 570	
		Waggoner 550	
		Mould 548	
Flight Shoot	436 yards 30 inches	Homer Prouty	1931
Free Style Flight Shoot			
1. Sitting and using feet	394 yards 11 inches	Homer Prouty	1932
2. Regular style	424 yards 32 inches	Rev. L. L. Daily	1930
(Note: This was not permitted after 1930)			

## WOMEN

Single National Round	70- 426	Mrs. Dorothy S. Cummings	1931
Double National Round	138- 847	Mrs. Dorothy S. Cummings	1931
Single Columbia Round	72- 530	Miss Dorothy Duggan	1931
Double Columbia Round	144-1046	Miss Dorothy Duggan	1931
Team Round	96- 624	Miss Gertrude Roach	1931
Team	363-2031	Los Angeles Archers	1932
Flight Shoot	328 yards 14 inches	Mrs. Elizabeth Roberts	1931

## BOYS

Single Junior American Round	89- 639	Brownell McGrew Jr.	1929
Double Junior American Round	178-1244	Brownell McGrew Jr.	1929

## GIRLS

Single Junior Columbia Round	72- 538	Madaline Taylor	1931
Double Junior Columbia Round	143-1059	Madaline Taylor	1931

The above are the rounds which are designated by the constitution of 1931 to have a place on the program of every annual tournament of the N. A. A. But, furthermore, that constitution and its predecessors permitted the authorities in charge of the tournament to add other events at their discretion. This privilege has been widely used and inasmuch as those events were just as authentic and were contested in just as good faith, it is well to tabulate their best records also, as follows:

# CHAMPION ARCHERS OF THE U. S. 481

## INTERMEDIATES—YOUNG MEN

Single and Double American and Single and Double Hereford  
Same as the Official American Records.

## INTERMEDIATES—YOUNG WOMEN

Single National Round	57- 275	Betty Gene Hunt	1929
Double National Round	105- 501	Betty Gene Hunt	1930
Single Columbia Round	70- 470	Betty Gene Hunt	1930
Double Columbia Round	140- 932	Betty Gene Hunt	1930
Single American Round by Women	90- 584	Ilda Hanchette	1932
	(172 at 60 yards)		
	90- 584	Dorothy Duggan	1931
	(162 at 60 yards)		
Double American Round by Women	179-1175	Ilda Hanchette	1932
Single American Round by Boys	87- 545	John Hobson	1932
Double American Round by Boys	176-1078	John Hobson	1932
Single American Round by Girls	81- 487	Madaline Taylor	1931
Double American Round by Girls	165- 963	Madaline Taylor	1931
Single Jr. Metropolitan Round, Boys	90- 682	Brownell McGrew Jr.	1929
Double Jr. Metropolitan Round, Boys	180-1338	Brownell McGrew Jr.	1929
Single Junior Metropolitan Round, Girls	87- 511	Marie Klopsteg	1930
Double Junior Metropolitan Round, Girls	172-1008	Margherita Childs	1930
Clout Shoot. 48 foot target.	180 yards for men and intermediates, 120 for women and juniors		
48 arrows, shot in 1927 only.	48-348	Dr. P. W. Crouch	
	48-322	Mrs. D. S. Cummings	
36 arrows	36-262	Carl G. Thompson (Men)	1930
	36-234	Mrs. I. M. Stamps (Women)	1932
	35-217	Shirley Peterson (Intermediates)	1932
	32-192	Mason Keeler (Juniors)	1932
Wand Shoot. Wands 6 feet by 2 inches.	100 yards for men, 60 for women.		
36 arrows	4 hits	Robert D. Jackson	1931
	8 hits	Dorothy Duggan	1931

The best records for the ranges of the four major rounds follow:

## MEN

100 yards	Single	56-270	Andrew Luke Brush	1931
	Double	110-496	Ralph H. Miller	1932
80 yards	Single	48-272	Russell Hoogerhyde	1932
	Double	91-493	Russell Hoogerhyde	1932
60 yards	Single	24-168	L. T. Coke	1929
(York)			Russell Hoogerhyde	1932
	Double	48-324	Dr. E. K. Roberts	1929
60 yards	Single	30-222	Russell Hoogerhyde	1931
(Amer.)	Double	60-416	Ralph H. Miller	1932
50 yards	Single	30-236	Ralph H. Miller	1932
			Russell Hoogerhyde	1932
40 yards	Single	30-258	Russell Hoogerhyde	1932
	Double	60-508	Russell Hoogerhyde	1932

## WOMEN

60 yards	Single	46-272	Ilda Hanchette	1932
	Double	91-513	Dorothy S. Cummings	1931
50 yards	Single	24-172	Dorothy S. Cummings	1931
(Nat.)	Double	48-334	Dorothy S. Cummings	1931
50 yards	Single	24-172	Dorothy Duggan	1931
(Col.)	Double	48-340	Ilda Hanchette	1932
40 yards	Single	24-180	Gertrude Roach	1931
	Double	48-354	Gertrude Roach	1931
30 yards	Single	24-202	Dorothy S. Cummings	1931
	Double	48-384	Mrs. M. C. Howell	1896

## RECORDS OF THE NATIONAL ARCHERY ASSOCIATION OF THE UNITED STATES

## DOUBLE YORK ROUND

		100 yards	80 yards	60 yards	Total
1879	Will H. Thompson.....	70-236	63-233	39-155	172-624
1880	L. L. Peddinghaus.....	55-221	56-274	41-211	152-708
1881	F. H. Walworth.....	67-261	64-262	42-240	173-763
1882	Homer S. Taylor.....	55-151	67-275	46-252	168-678a
1883	Robert Williams, Jr.....	76-300	79-371	44-236	199-907
1884	Will H. Thompson.....	63-237	68-314	43-209	174-760
1885	Robert Williams, Jr.....	91-357	78-360	46-278	215-995
1886	William A. Clark.....	43-195	72-298	43-225	158-718
1887	William A. Clark.....	42-134	64-244	43-201	149-579
1888	Will H. Thompson.....	66-244	71-309	38-180	175-733b
1889	Louis W. Maxson.....	66-220	68-308	46-238	180-766
1890	Louis W. Maxson.....	62-252	59-231	45-235	166-718
1891	Louis W. Maxson.....	53-197	66-304	44-218	163-719
1892	Louis W. Maxson.....	58-216	72-310	42-196	172-722
1893	Louis W. Maxson.....	59-241	60-220	45-253	164-714
1894	Louis W. Maxson.....	58-202	57-213	38-184	153-599
1895	W. R. Robinson.....	61-283	67-241	41-225	169-749
1896	D. F. McGowan.....	43-161	38-132	37-159	118-462
1897	William A. Clark.....	59-221	59-223	41-189	159-633
1898	Louis W. Maxson.....	61-241	63-259	35-277	159-677
1899	M. C. Howell.....	51-185	53-215	34-170	138-590
1900	A. R. Clark.....	59-213	76-342	45-205	180-758
1901	Will H. Thompson.....	61-237	57-229	45-215	163-681
1902	Robert Williams, Jr.....	56-212	56-228	38-172	150-612
1903	Wallace Bryant.....	50-212	66-240	41-201	157-653
1904	George Phillips Bryant...	79-281	67-293	46-246	192-820
1905	George Phillips Bryant...	72-274	59-259	41-183	172-716
1906	Henry B. Richardson....	81-331	79-367	41-193	201-891
1907	Henry B. Richardson....	73-307	66-312	45-241	184-860
1908	Will H. Thompson.....	88-362	78-368	45-243	211-973
1909	George Phillips Bryant...	102-402	80-330	45-243	227-975
1910	Henry B. Richardson....	96-400	89-445	46-265	231-1111
1911	Homer S. Taylor.....	78-338	63-259	40-228	181-835

a. Mr. Taylor won by points, Mr. D. A. Nash making 167 hits, 713 score.

b. Mr. Thompson won by points, Mr. Maxson making 171 hits, 739 score.



# CHAMPION ARCHERS OF THE U. S. 483

		100 yards	80 yards	60 yards	Total
1912	George Phillips Bryant...	105-435	78-374	47-285	230-1094
1913	Dr. J. W. Doughty.....	66-282	66-254	46-266	178-802c
1914	Dr. Robert P. Elmer.....	58-238	58-270	46-256	162-764
1915	Herman L. Walker.....	49-183	60-262	43-221	152-666
1916	Dr. Robert P. Elmer.....	90-390	74-364	46-266	210-1020
1917	No tournament.				
1918	No tournament.				
1919	Dr. Robert P. Elmer.....	91-359	79-379	48-278	218-1016
1920	Dr. Robert P. Elmer.....	68-278	68-276	48-258	184-812
1921	James S. Jiles.....	66-234	70-272	47-261	183-767
1922	Dr. Robert P. Elmer.....	94-434	81-365	44-240	219-1039
1923	William H. Palmer, Jr....	53-207	67-295	45-251	165-753
1924	James S. Jiles.....	69-279	73-379	45-231	187-889
1925	Dr. Robert P. Elmer.....	85-365	77-377	44-234	206-976
1926	Dr. Paul W. Crouch.....	74-328	80-354	47-265	201-947
1927	Dr. Paul W. Crouch.....	90-380	83-415	48-254	221-1049
1928	Andrew Luke Brush.....	98-398	81-385	44-246	223-1029
1929	Dr. E. K. Roberts.....	115-487	94-482	48-324	257-1293
1930	Russell Hoogerhyde.....	102-424	92-478	48-314	242-1216
1931	Russell Hoogerhyde.....	92-382	91-459	48-292	231-1133
1932	Russell Hoogerhyde.....	105-483	91-493	48-320	244-1296

c. Dr. Doughty won by points, Mr. G. P. Bryant making 176 hits, 832 score.

## DOUBLE AMERICAN ROUND

		60 yards	50 yards	40 yards	Total
1883	Col. Robert Williams, Jr..	56-290	60-392	60-404	176-1086
1884	Col. Robert Williams, Jr..	57-301	50-356	59-367	176-1024
1885	Col. Robert Williams, Jr..	57-295	60-356	60-404	177-1055
1886	William A. Clark.....	59-213	60-388	60-396	179-1097
1887	William A. Clark.....	54-266	60-342	60-384	174- 992
1888	Louis W. Maxson.....	59-277	56-280	60-404	175- 961
1889	J. T. Shawan.....	52-256	59-315	60-380	171- 951
1890	Louis W. Maxson.....	51-255	59-341	60-400	170- 996
1891	Louis W. Maxson.....	54-244	60-362	60-402	174-1008
1892	Louis W. Maxson.....	57-287	60-354	60-400	177-1041
1893	Louis W. Maxson.....	60-324	57-323	58-336	175- 983
1894	J. Benckenstein.....	50-240	60-292	59-339	169- 871
1895	Louis W. Maxson.....	53-287	59-325	60-402	172-1014
1896	Louis W. Maxson.....	54-272	56-306	60-364	170- 942
1897	William A. Clark.....	48-208	54-284	57-299	159- 791
1898	J. L. Taylor.....	50-246	57-315	58-324	165- 885
1899	William L. Clark.....	46-234	57-265	56-312	159- 811
1900	A. R. Clark.....	58-312	60-338	59-375	177-1025
1901	C. S. Woodruff.....	51-275	48-248	60-330	159- 853
1902	Col. Robert Williams, Jr..	50-286	55-283	59-361	164- 930
1903	Col. Robert Williams, Jr..	53-251	58-298	59-345	170- 878
1904	George Phillips Bryant...	56-270	60-366	60-412	176-1048
1905	C. C. Beach.....	56-280	58-354	60-372	174-1006
1906	Henry B. Richardson....	59-331	59-341	60-380	178-1052
1907	Col. Robert Williams, Jr..	56-296	59-333	60-380	175-1009
1908	Col. Robert Williams, Jr..	52-282	58-336	59-389	169-1007
1909	George Phillips Bryant...	56-322	60-380	60-416	176-1118

## ARCHERY

		60 yards	50 yards	40 yards	Total
1910	Henry B. Richardson.....	59-291	58-362	60-406	177-1059
1911	Dr. Robert P. Elmer.....	56-262	59-361	60-418	175-1041
1912	George Phillips Bryant...	58-338	59-373	60-442	177-1153
1913	Dr. Robert P. Elmer.....	54-248	57-329	59-423	170-1000
1914	Dr. Robert P. Elmer.....	56-312	60-332	60-408	176-1052
1915	Dr. Robert P. Elmer.....	57-299	60-364	60-412	177-1075
1916	Dr. Robert P. Elmer.....	54-306	59-359	60-400	173-1065
1917	No tournament.				
1918	No tournament.				
1919	Dr. Robert P. Elmer.....	60-322	59-389	60-436	179-1147
1920	Dr. Robert P. Elmer.....	55-287	60-388	60-432	175-1107
1921	Dr. Robert P. Elmer.....	59-321	58-340	60-416	177-1077
1922	Dr. Robert P. Elmer.....	59-315	59-329	60-408	178-1052
1923	William H. Palmer, Jr....	57-335	59-355	60-416	176-1106
1924	Rudolph Lagai.....	59-315	60-388	60-380	179-1083
1925	Dr. Paul W. Crouch.....	59-361	60-414	60-432	179-1207
1926	Stanley F. Spencer.....	59-331	58-388	60-434	177-1153
1927	Dr. Robert P. Elmer.....	59-333	60-372	60-422	179-1127
1928	William H. Palmer, Jr....	58-354	60-426	60-410	178-1190
1929	Dr. E. K. Roberts.....	60-406	60-418	60-484	180-1308
1930	Russell Hoogerhyde.....	59-401	60-428	60-472	179-1301
1931	Russell Hoogerhyde.....	59-403	60-442	60-498	179-1343
1932	Russell Hoogerhyde.....	60-412	60-460	60-508	180-1380

## FLIGHT SHOOT FOR MEN

		Yards	Inches
1882	J. Wilkinson, Chicago.....	213	
1883	No contest.		
1884	No contest.		
1885	W. P. Webb, Eaton, Ohio.....	234	
1886	J. J. Watrous, Cincinnati, Ohio.....	210	
1887	L. W. Maxson, Washington, D. C.....	226	
1888	L. W. Maxson, Washington, D. C.....	233	
1889	L. W. Maxson, Washington, D. C.....	266	
1890	L. W. Maxson, Washington, D. C.....	268	18
1891	L. W. Maxson, Washington, D. C.....	290	
1892	L. W. Maxson, Washington, D. C.....	213	
1893	C. J. Strong, Cincinnati, Ohio.....	285	18
1894	L. W. Maxson, Washington, D. C.....	253	
1895	G. Benckenstein, Wyoming, Ohio.....	247	
1896	L. W. Maxson, Washington, D. C.....	250	
1897	L. W. Maxson, Washington, D. C.....	240	
1898	L. W. Maxson, Washington, D. C.....	247	
1899	L. W. Maxson, Washington, D. C.....	224	
1900	L. W. Maxson, Washington, D. C.....	251	
1901	R. E. Taylor, Cincinnati, Ohio.....	230	
1902	A. E. Whitman, Melrose, Mass.....	244	
1903	L. W. Maxson, Washington, D. C.....	246	
1904	L. W. Maxson, Washington, D. C.....	259	
1905	Wallace Bryant, Boston, Mass.....	241	
1906	Homer S. Taylor, Chicago, Ill.....	230	
1907	Henry B. Richardson, Boston, Mass.....	218	
1908	J. M. Challis, Atchison, Kansas.....	232	
1909	Z. E. Jackson, Atchison, Kansas.....	245	

# CHAMPION ARCHERS OF THE U. S. 485

		<i>Yards</i>	<i>Inches</i>
1910	Homer W. Bishop, Chicago.....	213	8
1911	Dr. Robert P. Elmer, Wayne, Pa.....	270	9
1912	George Phillips Bryant, Boston, Mass.....	229	24
1913	Dr. Robert P. Elmer, Wayne, Pa.....	260	12
1914	James S. Jiles, Pittsburgh, Pa.....	234	¾
1915	No contest, on account of rain.		
1916	George Phillips Bryant, Boston, Mass.....	289	28
1917	No tournament.		
1918	No tournament.		
1919	George Phillips Bryant, Boston, Mass.....	286	6
1920	Abner Shepherdson, Melrose, Mass.....	274	34
1921	Dr. Saxton T. Pope, San Francisco, Calif.		
1922	Dr. Robert P. Elmer, Wayne, Pa.....	269	8
1923	Prof. Charles D. Curtis, Pembina, North Dakota...	273	32½
1924	Prof. Charles D. Curtis (using hands and feet)....	304	6¾
1925	Gustavus A. Mang, Buffalo, N. Y.....	259	34
1926	Frank W. Van Loon, Philadelphia, Pa.... (Too dark for measuring)		
1927	Stanley F. Spencer, San Pedro, Calif.....	294	10
1928	Howard Hill, Miami, Fla.....	300	9
1929	Dr. C. A. Cathey, Portland, Ore.....	353	10
1930	Roy I. Case, Jr., Racine, Wis.....	362	17
1931	Homer Prouty, Portland, Ore.....	436	30
1932	Homer Prouty, Portland, Ore.....	393	19½

## FREE STYLE FLIGHT SHOOT

		<i>Yards</i>	<i>Inches</i>
1925	Dr. P. W. Crouch (Using hands and feet).....	311	6
1926	Prof. C. D. Curtis (Using hands and feet).....	324	24
1927	Caleb Hyatt, Scarsdale, N. Y.....	267	8
1928	C. A. Hutchinson, Casper, Wyo. (Regular style)....	308	25½
1929	Dr. C. A. Cathey (Regular style).....	353	
1930	Rev. L. L. Daily, Monmouth, Ore. (Regular style)...	424	32
1931	Roy I. Case, Racine, Wis. (Using hands and feet)...	390	6
1932	Homer Prouty (Using hands and feet).....	394	11

## TEAM CONTEST FOR MEN

(4 a side)

### *Single American Round*

1879	Wabash Merry Bowmen, Crawfordsville, Ind.....	302-1508
1880	Marietta Archers, Marietta, Ohio.....	314-1640
1881	College Hills Archery, Cincinnati, Ohio.....	315-1611

### *Team Round*

1882	College Hills Archery Club, Cincinnati, Ohio.....	309-1435
1883	Highland Archery Club, Wyoming, Ohio.....	294-1332
1884	Battle Creek Archery Club, Battle Creek, Mich.....	315-1428
1885	Highland Archery Club, Wyoming, Ohio.....	327-1509
1886	Highland Archery Club, Wyoming, Ohio.....	285-1283
1887	Brooklyn Archery Club, Brooklyn, N. Y.....	301-1349
1888	Highland Archery Club, Wyoming, Ohio.....	316-1636
1889	Walnut Hills Archery Club, Cincinnati, Ohio.....	291-1367
1890	Walnut Hills Archery Club, Cincinnati, Ohio.....	314-1486
1891	Walnut Hills Archery Club, Cincinnati, Ohio.....	283-1307

1892	Walnut Hills Archery Club, Cincinnati, Ohio.....	311-1367
1893	Walnut Hills Archery Club, Cincinnati, Ohio.....	297-1383
1894	Potomac Archers, Washington, D. C. No other team present.	
1895	Walnut Hills Archery Club, Cincinnati, Ohio.....	286-1294
1896	Potomac Archers, Washington, D. C.....	252-1086
1897	Potomac Archers, Washington, D. C.....	297-1335
1898	Highland Archery Club, Wyoming, Ohio.....	284-1314
1899	Highland Archery Club, Wyoming, Ohio.....	275-1181
1900	Highland Archery Club, Wyoming, Ohio.....	306-1334
1901	Potomac Archers, Washington, D. C.....	296-1314
1902	Potomac Archers, Washington, D. C.....	287-1343
1903	Potomac Archers, Washington, D. C.....	284-1242
1904	Potomac Archers, Washington, D. C.....	300-1334
1905	Chicago Archery Club.....	309-1367
1906	Boston Archers.....	327-1591
1907	Chicago Archery Club.....	350-1680
1908	Chicago Archery Club.....	318-1528
1909	Boston Archers.....	300-1436
1910	Chicago Archery Club.....	330-1506
1911	Chicago Archery Club.....	318-1528
1912	Boston Archers.....	324-1618
1913	Boston Archers.....	328-1538
1914	Wayne Archers, Wayne, Pa.....	320-1578
1915	Stopped by rain at end of first half with the Wayne Archers in the lead.	
1916	Keystone Archers.....	342-1582
1917	No tournament.	
1918	No tournament.	
1919	Newton Archers, Newton Centre, Mass.....	312-1422
1920	Pittsburgh Archers.....	292-1368
1921	Pittsburgh Archers.....	299-1393
1922	Wayne Archers.....	329-1691
1923	Keystone Archers.....	299-1501
1924	Keystone Archers.....	333-1727
1925	Rome Archers, Rome, N. Y.....	325-1583
1926	Philadelphia Archery Association.....	334-1678
1927	No contest because of rain.	
1928	No contest because of rain.	
1929	Santa Monica Archery Club, Santa Monica, Calif.....	376-2268
1930	Santa Monica Archery Club, Santa Monica, Calif.....	363-2077
1931	Greenwich Archery Club, Greenwich, Ct.....	349-2017
1932	Locksley Archers, Seattle, Wash.....	374-2184

## DOUBLE NATIONAL ROUND

		60 yards	50 yards	Total
1881	Mrs. A. H. Gibbs.....	61-233	36-160	97-393
1882	Mrs. A. H. Gibbs.....	63-251	38-198	101-449
1883	Mrs. M. C. Howell.....	85-413	47-277	132-690
1884	Mrs. H. Hall.....	46-204	42-212	88-416
1885	Mrs. M. C. Howell.....	75-353	46-252	121-605
1886	Mrs. M. C. Howell.....	82-386	44-238	126-624
1887	Mrs. A. M. Phillips.....	83-385	48-246	131-631
1888	Mrs. A. M. Phillips.....	82-424	42-258	124-682
1889	Mrs. A. M. Phillips.....	89-481	44-232	133-713

# CHAMPION ARCHERS OF THE U. S. 487

		60 yards	50 yards	Total
1890	Mrs. M. C. Howell.....	79-353	46-226	125-579
1891	Mrs. M. C. Howell.....	59-221	45-243	104-464
1892	Mrs. M. C. Howell.....	79-353	48-272	127-625
1893	Mrs. M. C. Howell.....	84-380	45-247	129-627
1894	Mrs. A. Kern.....	67-343	45-237	112-580
1895	Mrs. M. C. Howell.....	86-474	46-282	132-756
1896	Mrs. M. C. Howell.....	81-361	45-249	126-610
1897	Mrs. J. S. Barker.....	70-294	42-226	112-520
1898	Mrs. M. C. Howell.....	88-428	44-210	130-638
1899	Mrs. M. C. Howell.....	84-426	46-242	130-668
1900	Mrs. M. C. Howell.....	81-387	44-268	125-665
1901	Mrs. C. S. Woodruff.....	34-146	33-145	67-291
1902	Mrs. M. C. Howell.....	82-366	44-238	126-604
1903	Mrs. M. C. Howell.....	87-381	48-272	135-653
1904	Mrs. M. C. Howell.....	87-417	43-203	130-620
1905	Mrs. M. C. Howell.....	80-366	44-204	124-570
1906	Miss E. C. Cooke.....	48-180	34-122	82-302
1907	Mrs. M. C. Howell.....	78-386	45-233	123-619
1908	Miss H. A. Case.....	60-248	32-150	92-398
1909	Miss H. A. Case.....	79-343	46-234	125-577
1910	Miss J. V. Sullivan.....	71-399	44-230	115-629
1911	Mrs. J. H. Taylor.....	53-197	41-199	94-396
1912	Mrs. J. H. Taylor.....	66-304	46-220	112-524
1913	Mrs. P. S. Fletcher.....	63-271	30-106	93-377
1914	Mrs. B. P. Gray.....	81-387	46-238	127-625
1915	Miss C. M. Wesson.....	85-455	45-253	130-708
1916	Miss C. M. Wesson.....	80-356	44-226	124-582
1917	No tournament.			
1918	No tournament.			
1919	Miss D. D. Smith.....	80-360	42-194	122-554
1920	Miss C. M. Wesson.....	80-332	45-203	125-535
1921	Miss D. D. Smith.....	78-316	40-214	118-530
1922	Miss D. D. Smith.....	74-316	46-236	120-552
1923	Miss N. L. Peirce.....	51-229	30-122	81-351
1924	Miss D. D. Smith.....	78-338	43-237	121-575
1925	Miss D. D. Smith.....	82-358	44-238	126-596
1926	Miss D. D. Smith.....	88-400	44-234	132-624
1927	Mrs. Robert Johnson.....	88-410	46-270	134-680
1928	Mrs. Beatrice Hodgson.....	80-380	46-240	126-620
1929	Mrs. Beatrice Hodgson.....	88-408	48-234	132-642
1930	Mrs. Philip Rounsevelle.....	85-423	43-235	128-658
1931	Mrs. Dorothy S. Cummings.....	91-513	48-334	139-847
1932	Miss Ilda Hanchette.....	86-466	48-306	134-772

## DOUBLE COLUMBIA ROUND

		50 yards	40 yards	30 yards	Total
1879	Mrs. S. Brown.....	28-132	36-152	46-264	110-548
1880	Mrs. T. Davis.....	30-112	37-203	47-283	114-598
1883	Mrs. M. C. Howell.....	46-272	48-316	48-352	142-940
1885	Mrs. M. C. Howell.....	46-232	48-276	48-334	142-842
1886	Mrs. M. C. Howell.....	47-283	48-284	48-326	143-893
1887	Mrs. A. M. Phillips.....	46-286	48-318	48-376	142-980
1888	Mrs. A. M. Phillips.....	45-255	48-300	48-346	141-901
1889	Mrs. A. M. Phillips.....	47-267	48-320	48-358	143-945



## ARCHERY

		50 yards	40 yards	30 yards	Total
1890	Mrs. M. C. Howell.....	48-292	48-320	48-354	144-966
1891	Mrs. M. C. Howell.....	42-224	47-259	48-330	137-813
1892	Mrs. M. C. Howell.....	44-206	48-282	48-330	140-818
1893	Mrs. M. C. Howell.....	45-233	48-302	48-344	141-879
1894	Mrs. A. Kern.....	39-169	38-212	47-291	124-666
1895	Mrs. M. C. Howell.....	45-281	48-332	48-356	141-969
1896	Mrs. M. C. Howell.....	48-290	48-316	48-384	144-990
1897	Mrs. J. S. Barker.....	42-190	45-237	48-320	135-747
1898	Mrs. M. C. Howell.....	45-247	45-305	48-362	140-914
1899	Mrs. M. C. Howell.....	45-251	48-292	48-342	141-885
1900	Mrs. M. C. Howell.....	47-265	47-303	48-340	142-908
1901	Mrs. C. S. Woodruff....	37-177	42-198	40-252	119-627
1902	Mrs. M. C. Howell.....	45-215	48-282	48-352	141-849
1903	Mrs. M. C. Howell.....	45-233	47-303	48-276	140-862
1904	Mrs. M. C. Howell.....	45-245	48-274	48-348	141-867
1905	Mrs. M. C. Howell.....	47-253	47-305	48-352	142-910
1906	Miss E. C. Cooke.....	32-146	33-141	47-249	112-536
1907	Mrs. M. C. Howell.....	47-257	48-322	48-352	143-931
1908	Miss Harriet A. Case....	29-127	38-182	45-237	112-546
1909	Miss Harriet A. Case....	37-171	47-241	48-320	132-732
1910	Miss L. M. Witwer.....	36-168	46-268	45-297	127-733
1911	Mrs. J. H. Taylor.....	38-168	45-231	48-332	131-731a
1912	Mrs. J. H. Taylor.....	39-181	45-261	47-345	131-787
1913	Mrs. Louis C. Smith....	29-107	40-204	47-263	116-574b
1914	Mrs. Burton Payne-Gray..	47-239	48-258	48-342	143-839
1915	Miss Cynthia M. Wesson..	48-294	48-328	48-356	144-998
1916	Miss Cynthia M. Wesson..	43-191	48-302	48-354	139-847
1917	No tournament.				
1918	No tournament.				
1919	Miss Dorothy D. Smith...	44-244	46-246	47-321	137-811
1920	Miss Cynthia M. Wesson..	43-233	48-302	48-326	139-861
1921	Mrs. Louis C. Smith.....	41-195	47-271	47-309	135-775
1922	Miss Dorothy D. Smith...	45-219	48-278	47-307	140-804
1923	Miss Norma L. Peirce....	31-149	42-218	43-227	116-594
1924	Miss D. D. Smith.....	43-221	46-262	47-301	136-784
1925	Miss D. D. Smith.....	42-226	45-265	48-334	135-825
1926	Miss D. D. Smith.....	47-261	47-293	48-288	142-842
1927	Mrs. Dorothy S. Cummings	47-269	47-307	48-334	142-910
1928	Mrs. George A. Smith....	46-262	48-270	48-324	142-856
1929	Mrs. Audrey Grubbs.....	46-298	47-315	48-378	141-991
1930	Mrs. Audrey Grubbs.....	48-282	47-325	48-358	143-965
1931	Miss Dorothy Duggan....	48-320	48-352	48-374	144-1046
1932	Miss Ilda Hanchette.....	48-286	48-340	47-357	143-983

a. Same as Miss Witwer, married during the interim.

b. Mrs. Smith won by points, Mrs. P. S. Fletcher making 114-586.

## FLIGHT SHOOT FOR WOMEN

		<i>Yards Inches</i>
1882	Mrs. Frye, Williamsport, Pa. ....	162
1883	No contest.	
1884	No contest.	
1885	No contest.	



# CHAMPION ARCHERS OF THE U. S. 489

		<i>Yards</i>	<i>Inches</i>
1886	Mrs. A. M. Phillips, Battle Creek, Mich.....	183	
1887	Mrs. A. M. Phillips, Battle Creek, Mich.....	175	24
1888	Miss E. C. Cooke, Washington, D. C.....	180	
1889	Mrs. A. Kern, Dayton, Ohio.....	210	12
1890	Mrs. A. Kern, Dayton, Ohio.....	189	6
1891	Miss E. C. Cooke, Washington, D. C.....	211	12
1892	Mrs. J. G. Graf, Walnut Hills, Ohio.....	151	
1893	Miss M. E. Strong, Cincinnati, Ohio.....	187	
1894	Miss E. C. Cooke, Washington, D. C.....	178	6
1895	Mrs. J. S. Barker, Washington, D. C.....	197	
1896	Miss E. C. Cooke, Washington, D. C.....	182	
1897	Miss E. C. Cooke, Washington, D. C.....	172	
1898	No contest.		
1899	Mrs. A. Kern, Dayton, Ohio.....	211	
1900	Mrs. M. C. Howell, Norwood, Ohio.....	141	
1901	Miss Georgie Clark, Wyoming, Ohio.....	195	
1902	Miss E. C. Cooke, Washington, D. C.....	190	
1903	Miss Mabel Taylor, Cincinnati, Ohio.....	174	
1904	Miss Mabel Taylor, Cincinnati, Ohio.....	219	
1905	No contest.		
1906	Mrs. E. W. Frentz, Melrose, Mass.....	197	
1907	Mrs. Amelia Barbe, Chicago.....	147	
1908	Mrs. W. G. Valentine, Chicago.....	139	
1909	Mrs. E. W. Frentz, Melrose, Mass.....	188	
1910	Miss L. M. Witwer, Chicago.....	162	
1911	Miss F. M. Patrick, Oak Park, Ill.....	189	
1912	Mrs. G. P. Bryant, Melrose, Mass.....	229	24
1913	Mrs. G. P. Bryant, Melrose, Mass.....	251	$\frac{4}{10}$
1914	Mrs. E. W. Frentz, Melrose, Mass.....	220	$29\frac{1}{2}$
1915	No contest, on account of rain.		
1916	Miss Cynthia M. Wesson, Cotuit, Mass.....	204	23
1917	No tournament.		
1918	No tournament.		
1919	Miss Stella M. Ives, Roslindale, Mass.....	202	24
1920	Miss Cynthia M. Wesson, Cotuit, Mass.....	210	
1921	Miss Stella M. Ives, Roslindale, Mass.		
1922	Mrs. E. W. Frentz, Melrose, Mass.		
1923	Miss Norma L. Peirce, Boston, Mass. Approximately	200	
1924	Miss Katherine Howe, Dorset, Vt.....	255	$11\frac{1}{2}$
1925	Mrs. E. W. Frentz, Melrose, Mass.....	239	5
1926	Mrs. Philip Rounseville..... (Not measured; darkness and rain.)		
1927	Mrs. Philip Rounseville.....	250	10
1928	Mrs. Elizabeth Bennett Roberts.....	239	4
1929	Mrs. Homer Prouty.....	273	2
1930	Mrs. Elizabeth Bennett Roberts.....	299	14
1931	Mrs. Elizabeth Bennett Roberts.....	328	14
1932	Mrs. E. J. Partlow.....	288	29

## TEAM CONTEST FOR WOMEN

(4 a side)

*72 Arrows at 40 Yards*

1882a	College Hills Archery Club, Cincinnati, Ohio.....	182- 874
1883	Highland Archers, Wyoming, Ohio.....	238-1076

a. Three on a side.

*96 Arrows at 50 Yards*

1884	No contest.	
1885	Highland Archers, Wyoming, Ohio.....	291-1321
1886a	Highland Archers, Wyoming, Ohio.....	167- 751
1887	Robin Hood Archery Club, Dayton, Kentucky.....	279-1229
1888	Robin Hood Archery Club, Dayton, Kentucky.....	263-1169
1889	Robin Hood Archery Club, Dayton, Kentucky.....	222- 876
1890	Walnut Hills Archery Club, Cincinnati, Ohio.....	268-1192
1891	Walnut Hills Archery Club, Cincinnati, Ohio.....	238-1070
1892	No contest.	
1893	Walnut Hills Archery Club. No other team present.	
1894	Potomac Archers, Washington, D. C. No other team present.	
1895	No contest.	
1896	Potomac Archers, Washington, D. C.....	199- 833
1897	Potomac Archers, Washington, D. C.....	218- 932
1898	Walnut Hills Archery Club, Cincinnati, Ohio.....	231-1033
1899	Walnut Hills Archery Club. No other team present.	
1900	Walnut Hills Archery Club, Cincinnati, Ohio.....	216- 938
1901	Highland Archers, Wyoming, Ohio.....	196- 864
1902	No contest.	
1903	Cincinnati Archery Association.....	285-1307
1904	Cincinnati Archery Association.....	260-1144
1905	Chicago Archery Club.....	162- 616
1906	Boston Archers.....	172- 688
1907	Chicago Archery Club.....	225- 819
1908	Chicago Archery Club.....	147- 513
1909	Chicago Archery Club.....	277-1295
1910	Chicago Archery Club.....	315-1517
1911	Chicago Archery Club.....	201- 861
1912	Boston Archers.....	248-1078
1913	Newton Archers, Newton Centre, Mass.....	231-1083
1914	Wayne Archers, Wayne, Pa.....	295-1405
1915	No contest.	
1916	Wayne Archers, Wayne, Pa.....	250-1088
1917	No tournament.	
1918	No tournament.	
1919	Newton Archers, Newton Centre, Mass.....	282-1250
1920	Boston Archers.....	265-1181
1921	Newton Archers, Newton Centre, Mass.....	320-1504
1922	Newton Archers, Newton Centre, Mass.....	325-1525
1923	Contested by individuals only, no regular teams.	
1924	Newton Archers, Newton Centre, Mass.....	309-1419
1925	Newton Archers, Newton Centre, Mass.....	323-1549
1926	Newton Archers, Newton Centre, Mass.....	305-1481
1927	Newton Archers, Newton Centre, Mass.....	334-1664
1928	Scarsdale Archers, Scarsdale, N. Y.....	334-1700
1929	Santa Monica Archery Club, Santa Monica, Calif.....	355-1843
1930	Lincoln Park Archery Club, Chicago.....	316-1502
1931	Buffalo Archers, Buffalo, N. Y.....	325-1763
1932	Los Angeles Archers, Los Angeles, Calif.....	363-2031

a. Three on a side.

The following tables show the places where the Annual

# CHAMPION ARCHERS OF THE U. S. 491

Tournaments of the National Archery Association have been held and the number of contestants in each.

	<i>Men</i>	<i>Women</i>	<i>Total</i>
1879 Chicago .....	69	20	89
1880 Buffalo, N. Y. ....	35	11	46
1881 Brooklyn, N. Y. ....	57	19	76
1882 Chicago .....	31	13	44
1883 Cincinnati .....	42	27	69
1884 Pullman, Ill. ....	15	1	16
1885 Eaton, Ohio. ....	22	17	39
1886 Chautauqua, N. Y. ....	11	12	23
1887 Washington, D. C. ....	28	18	46
1888 Dayton, Ohio .....	35	21	56
1889 Dayton, Ohio .....	27	24	51
1890 Norwood, Ohio .....	23	15	38
1891 Natural Bridge, Va. ....	16	12	28
1892 Fortress Monroe, Va. ....	18	5	23
1893 Dayton, Ohio .....	24	8	32
1894 Washington, D. C. ....	11	7	18
1895 Dayton, Ohio .....	20	4	24
1896 White Sulphur Springs, Va. ....	6	5	11
1897 Washington, D. C. ....	6	5	11
1898 Wyoming, Ohio. ....	13	6	19
1899 Norwood, Ohio. ....	10	6	16
1900 Cincinnati .....	13	6	19
1901 Cincinnati .....	14	7	21
1902 Mountain Lake Park, Md. ....	13	5	18
1903 Niagara Falls, N. Y. ....	15	6	21
1904 St. Louis. ....	22	6	28
1905 Chicago .....	34	7	41
1906 Boston .....	14	5	19
1907 Chicago .....	26	10	36
1908 Chicago .....	25	8	33
1909 Chicago .....	20	16	36
1910 Chicago .....	23	16	39
1911 Chicago .....	17	15	32
1912 Boston .....	19	12	31
1913 Boston .....	25	10	35
1914 Haverford, Pa. ....	34	18	52
1915 Chicago .....	19	8	27
1916 Jersey City, N. J. ....	18	9	27
1917 No tournament on account of the war.			
1918 No tournament on account of the war.			
1919 Boston .....	26	14	40
1920 Wayne, Pa. ....	19	11	30
1921 Boston .....	28	18	46
1922 Cooperstown, N. Y. ....	28	16	44
1923 Chicago .....	22	8	30
1924 Deerfield, Mass. ....	39	15	54
1925 Rome, N. Y. ....	46	16	62

		Men	Women	Total
1926	Bryn Mawr, Pa. ....	61	17	78
	(19 men and 15 women competed as Sesqui-centennial entrants; total 112)			
1927	Boston, Mass. ....	64	29	93
1928	Rye, N. Y. ....	69	25	94
1929	Santa Barbara, Calif. ....	83	31	114
1930	Chicago ....	84	36	120
1931	Canandaigua, N. Y. ....	114	41	155
1932	Seattle, Wash. ....	62	29	91

When Dr. Weston wrote *The Official Archery Guide*, for Spalding's Athletic Library, in 1908, that rare and excellent book on which this one is based and the fee for which he expended in the purchase of the Weston Cup, he ranked the fourteen winners of the double York round and the eleven winners of the double American round according to the average of their winning scores. For whatever value such lists may possess, they are here continued to the present time, with the addition of similar computations for the ladies. In twenty-two subsequent contests, nine more men have won the York and seven more the American.

### RANK OF THE WINNERS OF THE DOUBLE YORK AND DOUBLE AMERICAN ROUNDS

#### DOUBLE YORK ROUND

	Times Win- ner	Ave. Winning Scores	Best Score	Ave. All Scores	No. Con- tests	Per- cent. Wins
1. Roberts .....	1	257-1293	257-1293	230-1146	3	33.3
2. Hoogerhyde ....	3	239-1215	244-1296	239-1215	3	100
3. Brush .....	1	223-1029	224-1088	204- 954	5	20
4. Crouch .....	2	211- 998	221-1049	198- 890	7	28.6
5. Richardson ....	3	207- 955	231-1111	164- 704	8	37.5
6. Elmer .....	6	200- 938	219-1039	185- 817	17	35.3
7. G. P. Bryant....	4	205- 901	230-1094	185- 815	8	50
8. Williams .....	3	188- 838	215- 995	166- 716	14	21.4
9. Jiles .....	2	186- 828	187- 889	158- 666	15	13.3
10. Doughty .....	1	178- 802	178- 802	144- 606	3	33.3
11. Walworth .....	1	173- 763	173- 763	159- 677	2	50
12. A. R. Clark (a). .	1	180- 758	180- 758	164- 702	2	50
13. Taylor (b).....	2	179- 757	181- 835	142- 634	24	8.3
14. Thompson .....	5	178- 754	211- 973	162- 680	18	27.8

a. Clark, in 1914, stopped after the first 100 yards because of the sun, as he had recently been sun-struck in India.

b. Taylor, in 1931, did not shoot the second York because of illness.

# CHAMPION ARCHERS OF THE U. S. 493

	<i>Times Win- ner</i>	<i>Ave. Winning Scores</i>	<i>Best Score</i>	<i>Ave. All Scores</i>	<i>No. Con- tests</i>	<i>Per- cent. Wins</i>
15. Palmer .....	1	165- 753	219-1021	154- 648	9	11.1
16. Robinson .....	1	169- 749	169- 749	155- 629	2	50
17. Peddinghaus ...	1	152- 708	152- 708	123- 537	2	50
18. Maxson .....	7	166- 702	180- 766	136- 564	17	41
19. Walker .....	1	152- 666				
20. W. Bryant (c) ..	1	167- 653	183- 797	131- 603	8	12.5
21. W. A. Clark....	3	155- 643	158- 718	125- 507	15	20
22. Howell .....	1	138- 590	138- 590	118- 492	10	10
23. McGowan .....	1	118- 462	146- 544	106- 410	10	10

c. Bryant, in 1921, shot only one York.

## DOUBLE AMERICAN ROUND

	<i>Times Win- ner</i>	<i>Ave. Winning Scores</i>	<i>Best Score</i>	<i>Ave. All Scores</i>	<i>No. Con- tests</i>	<i>Per- cent. Wins</i>
1. Hoogerhyde ....	3	179-1341	180-1380	179-1341	3	100
2. Roberts .....	1	180-1308	180-1308	180-1250	3	33.3
3. Crouch .....	1	179-1207	179-1207	171-1041	7	14.3
4. Spencer .....	1	177-1153	179-1185	177-1127	4	25
5. Palmer .....	2	178-1148	178-1190	170- 954	9	11.1
6. Bryant .....	3	176-1102	177-1153	169- 991	7	14.3
7. Lagai .....	1	179-1083	179-1083	175- 961	2	33.3
8. Elmer .....	10	176-1074	179-1147	176-1070	17	41.1
9. Richardson ....	2	177-1055	177-1059	178- 846	8	25
10. A. R. Clark....	1	177-1025	177-1025	162- 650	5	20
11. Williams .....	6	174-1008	176-1086	169- 919	11	54.5
12. Beach .....	1	174-1006	174-1006	163- 886	11	9
13. Maxson .....	7	174- 992	177-1041	161- 855	19	36.8
14. Shawan .....	1	171- 951	171- 951	162- 862	4	25
15. W. A. Clark....	4	168- 898	179-1097	159- 827	23	17.4
16. J. L. Taylor....	1	165- 885	165- 885	151- 749	7	14.3
17. Benckenstein ...	1	169- 871	169- 871	139- 657	8	12.5
18. Woodruff .....	1	159- 853	171- 933	160- 820	6	16.6

## RANK OF THE WINNERS OF THE DOUBLE NATIONAL AND DOUBLE COLUMBIA ROUNDS

### DOUBLE NATIONAL ROUND

	<i>Times Winner</i>	<i>Av. Winning Scores</i>	<i>Highest Winning Scores</i>
1. Miss Ilda Hanchette.....	1	134-772	134-772
2. Mrs. Robert Johnson.....	1	134-680	134-680
3. Mrs. A. M. Phillips.....	3	127-675	133-713
4. Mrs. P. Rounseville.....	1	128-658	128-658
5. Mrs. Beatrice Hodgson.....	2	129-631	132-642
6. Miss J. V. Sullivan.....	1	115-629	115-629
7. Mrs. B. P. Gray.....	1	127-625	127-625
8. Mrs. Dorothy S. Cummings.....	7	125-611	139-847
9. Miss C. M. Wesson.....	3	126-606	130-708
10. Mrs. M. C. Howell.....	17	122-606	132-756

## ARCHERY

	<i>Times Winner</i>	<i>Av. Winning Scores</i>	<i>Highest Winning Scores</i>
11. Mrs. C. S. Woodruff.....	1	126-604	126-604
12. Mrs. A. Kern.....	1	112-580	112-580
13. Mrs. J. S. Barker.....	1	112-520	112-520
14. Miss H. A. Case.....	2	109-487	125-577
15. Mrs. J. H. Taylor.....	2	102-460	112-524
16. Mrs. A. H. Gibbs.....	2	99-421	101-449
17. Mrs. H. Hall.....	1	88-416	88-416
18. Mrs. P. S. Fletcher.....	1	93-377	93-377
19. Miss Norma Peirce.....	1	81-351	81-351
20. Miss E. C. Cooke.....	1	82-302	82-302

## DOUBLE COLUMBIA ROUND

	<i>Times Winner</i>	<i>Av. Winning Scores</i>	<i>Highest Winning Scores</i>
1. Miss Dorothy Duggan.....	1	144-1046	144-1046
2. Miss Ilda Hanchette.....	1	143- 983	143- 983
3. Mrs. Audrey Grubbs.....	2	142- 978	141- 991
4. Mrs. A. M. Phillips.....	3	142- 942	142- 980
5. Miss Cynthia M. Wesson.....	3	140- 902	144- 998
6. Mrs. M. C. Howell.....	17	142- 896	144- 990
7. Mrs. George A. Smith.....	1	142- 856	142- 856
8. Mrs. B. P. Gray.....	1	143- 839	143- 839
9. Mrs. Dorothy S. Cummings.....	6	139- 829	142- 910
10. Mrs. J. H. Taylor.....	3	130- 750	131- 787
11. Mrs. J. S. Barker.....	1	135- 747	135- 747
12. Mrs. Louis C. Smith.....	2	125- 675	135- 775
13. Mrs. A. Kern.....	1	126- 666	126- 666
14. Miss H. A. Case.....	2	123- 629	132- 732
15. Mrs. C. S. Woodruff.....	1	119- 627	119- 627
16. Mrs. T. Davis.....	1	114- 598	114- 598
17. Miss Norma L. Peirce.....	1	116- 594	116- 594
18. Mrs. S. Brown.....	1	110- 548	110- 548

RECORDS OF THE EASTERN ARCHERY  
ASSOCIATION  
YORK ROUND

<i>Year</i>	<i>Name</i>	<i>Single York</i>	<i>Double York</i>
1879	Not shot.		
1880	L. L. Peddinghaus, Brooklyn, N. Y.	59-201; 70-318	129-519
1881	Andrew S. Brownell, Watertown, Mass. ....	Not known.	
1882	D. A. Nash, Brooklyn, N. Y.....	87-893; 81-395	168-788
1883 to 1890	No information.		
1891	Louis W. Maxson, Washington....	.....	160-666
1892	L. W. Maxson.....	.....	191-799
1893	" .....	81-333; 78-320	165-653
1894	No meeting.		
1895	C. E. McNabb, Wash.....	76-326; 57-261	133-587
1896	D. F. McGowan, Wash.....	No scores recorded.	
1897	L. W. Maxson.....	84-342; 70-330	154-672
1898	" .....	80-346; 72-320	152-666
1899	" .....	91-383; 99-429	190-812



# CHAMPION ARCHERS OF THE U. S. 495

<i>Year</i>	<i>Name</i>	<i>Single York</i>	<i>Double York</i>
1900	A. R. Clark.....	95-431; 83-373	178-804
1901	".....	72-294; 77-335	149-629
1902	No match.		
1903	Wallace Bryant, Boston.....	88-350; 84-374	172-724
1904 to 1910	No contests.		
1911	Wallace Bryant.....	97-443	Not shot
1912	G. Phillips Bryant, Boston.....	101-467	Not shot
1913	Not shot.		
1914	James S. Jiles, Pgh.....	Not recorded	154-722
1915	Cyrus E. Dallin, Arlington Heights, Mass. ....	91-417	Not shot
1916	James Duff, Jersey City, N. J.....	90-394; 81-365	171-759
1917	War. No match.		
1918	War. No match.		
1919	Homer S. Taylor, Greenfield, Mass.	91-415	Not shot
1920	".....	Not recorded	182-780
1921	Dr. R. P. Elmer, Wayne, Pa.....	96-468	Not shot
1922	J. S. Jiles.....	Not recorded	156-660
1923	Dr. R. P. Elmer.....	106-512	Not shot
1924	Rudolph Lagai, Brooklyn and Rome, N. Y. ....	69-337; 86-406	155-743
1925	Dr. Paul W. Crouch, Boston.....	113-529; 100-502	213-1031
1926	".....	106-492; 115-535	221-1027
1927	".....	113-589; 119-553	232-1142
1928	".....	102-492; 110-486	212- 978
1929	".....	118-516; 117-575	235-1091
1930	Carl G. Thompson, Pinehurst, N. C.	125-607; 110-518	235-1125
1931	Andrew Luke Brush.....	113-505; 115-567	228-1072
1932	Carl G. Thompson, Pinehurst, N. C.	121-561; 128-626	249-1187

## AMERICAN ROUND

<i>Year</i>	<i>Name</i>	<i>Single American</i>	<i>Double American</i>
1879	E. R. Dwight, Watertown.....	Not recorded	122-556
1880	L. L. Peddinghaus.....	83-448; 83-409	166-852
1881	Mr. Baker.....		
1882	Dr. H. T. Elliot, New York.....	74-372; 76-402	150-774
1883 to 1890	No information.		
1891	L. W. Maxson.....		172-1034
1892	".....		176-1080
1893	".....	88-532; 87-499	175-1031
1894	No match.		
1895	C. E. McNabb.....	81-483; 78-404	159-887
1896	L. W. Maxson.....	Not recorded	
1897	".....	82-476; 84-480	166-956
1898	".....	84-412; 76-386	160-798
1899	".....	84-428; 81-413	165-841
1900	A. R. Clark.....	88-542; 86-556	174-1098
1901	".....	Not recorded	160-866
1902	No match.		
1903	Wallace Bryant.....	87-525; 89-567	176-1092
1904 to 1910	No matches.		
1911	G. P. Bryant.....	88-464	Not shot
1912	".....	88-550	Not shot

<i>Year</i>	<i>Name</i>	<i>Single American</i>	<i>Double American</i>
1913	Dr. R. P. Elmer.....	88-528; 86-504	174-1032
1914	James Duff.....	Not recorded	165-963
1915	C. E. Dallin.....	87-471	Not shot
1916	A. Shepherdson, Melrose, Mass....	83-483; 80-446	163-929
1917	War. No match.		
1918	War. No match.		
1919	Arthur Young, San Francisco.....	88-562	Not shot
1920	H. S. Taylor.....	Not recorded	172-1008
1921	Dr. R. P. Elmer.....	87-561	Not shot
1922	J. S. Jiles.....	Not recorded	177-1077
1923	Dr. R. P. Elmer.....	89-519; 89-555	178-1074
1924	Rudolph Lagai.....	90-558; 86-508	176-1066
1925	Dr. P. W. Crouch.....	90-602; 90-588	180-1190
1926	William H. Palmer, Jr., St. Davids, Pa. ....	87-583; 89-589	176-1072
1927	Dr. P. W. Crouch.....	90-620; 90-612	180-1232
1928	".....	86-518; 90-556	176-1074
1929	G. A. Clark, Waltham, Mass.....	89-589; 88-564	177-1153
1930	Dr. P. W. Crouch.....	88-576; 89-575	177-1151
1931	Dr. William M. Hale, New Haven, Ct. ....	89-581; 88-570	177-1151
1932	W. Ervington Long, Newtonville, Mass. ....	89-601; 90-600	179-1201

## NATIONAL ROUND

<i>Year</i>	<i>Name</i>	<i>Single National</i>	<i>Double National</i>
1897	Not shot.		
1880	Miss Ager.....	35-141; 35-131	70-272
1881	Probably Miss Morse.		
1882	Mrs. A. H. Gibbs, Newark, N. J...	41-153; 43-185	84-338
1883 to 1890	No information.		
1891	Miss M. L. Williams.....	.....	79-323
1892	".....	.....	89-367
1893	Mrs. J. S. Barker.....	52-216; 51-203	103-419
1894	No match.		
1895	Miss E. C. Cooke.....	51-227; 57-277	108-504
1896	Mrs. J. S. Barker.....	Not recorded	
1897	Not shot.		
1898	Miss E. C. Cooke.....	46-206; 50-228	96-434
1899	".....	51-239; 48-238	99-477
1900	".....	53-195; 47-195	100-390
1901	Mrs. E. S. Barber.....	45-207; 42-216	87-423
1902	No match.		
1903	Miss E. C. Cooke.....	Not recorded	
1904 to 1910.	No matches.		
1911	Miss Helen Hutchinson, Boston....	65-323	Not shot
1912	".....	48-210	Not shot
1913 and 1914	No women entered.		
1915	Mrs. B. P. Gray.....	Not recorded	116-558
1916	".....	23-247; 58-310	111-557
1917 and 1918	War. No match.		
1919	Not shot.		
1920	Miss D. D. Smith.....	Not recorded	118-510
1921	".....	300	Not recorded

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<i>Year</i>	<i>Name</i>	<i>Single National</i>	<i>Double National</i>
1922	Miss D. D. Smith.....	Not recorded	117-545
1923	" .....	63-343; 69-337	132-680
1924	" .....	58-276; 61-311	119-587
1925	" .....	53-253; 59-237	112-490
1926	" .....	64-316; 68-306	132-622
1927	Mrs. N. C. Owen, Scarsdale, N. Y.	65-315; 62-320	127-635
1928	Mrs. Philip Rounsevelle, Pinehurst, N. C.....	51-247; 62-328	113-575
1929	Mrs. Dorothy Smith Cummings....	70-376; 66-356	136-732
1930	Miss Dorothy Duggan, Greenwich, Ct. ....	66-310; 68-434	134-744
1931	Mrs. Dorothy Smith Cummings....	69-427; 71-405	140-832
1932	" .....	67-393; 69-411	136-804

## COLUMBIA ROUND

<i>Year</i>	<i>Name</i>	<i>Single Columbia</i>	<i>Double Columbia</i>
1879	Miss Silsbee, Watertown.....	Not recorded	86-406
1880	Miss Ager, Jamaica Plain, Mass....	52-240; 56-286	108-526
1881	Mrs. Baker.		
1882	Mrs. D. A. Nash, Brooklyn.....	60-318; 52-202	112-520
1883 to 1890	No matches.		
1891	Miss M. Hinman, Washington.....	.....	120-550
1892	Miss M. L. Williams, " .....	.....	128-682
1893	Mrs. J. S. Barker, " .....	67-381; 64-318	131-699
1894	No match.		
1895	Miss E. C. Cooke, Washington.....	68-378; 64-350	132-728
1896	Mrs. J. S. Barker, " .....	Not recorded	
1897	Miss E. C. Cooke, " .....	66-362; 66-346	132-708
1898	" " .....	64-294; 66-338	130-632
1899	" " .....	65-319; 62-332	127-651
1900	" " .....	67-315; 63-315	130-630
1901	Mrs. E. S. Barber, " .....	55-273; 59-265	87-423
1902	No match.		
1903	Miss E. C. Cooke.....	Not recorded	
1904 to 1910	No matches.		
1911	Not shot.		
1912	Mrs. Witwer-Taylor, Chicago.....	71-449	Not shot
1913 and 1914	No women entered.		
1915	Mrs. Burton Payne-Gray, Boston...	Not recorded	139-797
1916	Miss Cynthia M. Wesson, Cotuit, Mass. ....	67-347; 70-398	137-745
1917 and 1918	War. No matches.		
1919	Not shot.		
1920	Dorothy D. Smith, Newton Centre, Mass. ....	Not recorded	134-722
1921	Dorothy D. Smith, Newton Centre, Mass. ....	462	Not shot
1922	Dorothy D. Smith, Newton Centre, Mass. ....	Not recorded	132-752
1923	Dorothy D. Smith, Newton Centre, Mass. ....	68-402; 70-428	138-830
1924	Dorothy D. Smith, Newton Centre, Mass. ....	70-382; 68-402	138-784

<i>Year</i>	<i>Name</i>	<i>Single Columbia</i>	<i>Double Columbia</i>
1925	Dorothy D. Smith, Newton Centre, Mass. ....	71-425; 70-426	141-851
1926	Dorothy D. Smith, Newton Centre, Mass. ....	69-361; 71-455	140-816
1927	Mrs. N. C. Owen.....	67-425; 67-421	134-846
1928	Mrs. Philip Rounsevelle.....	71-439; 69-439	140-878
1929	Mrs. Dorothy S. Cummings.....	72-494; 70-498	142-992
1930	Dorothy Duggan.....	71-487; 70-476	141-963
1931	Mrs. Dorothy S. Cummings.....	72-512; 72-520	144-1032
1932	Mrs. Flora Hale, New Haven, Ct..	72-494; 71-503	143-997

Whilst the foregoing scores and other records were made in tournaments that were recognized by the N. A. A., and therefore are perfectly authentic, they only rarely represent the best performance of the archer. In private practice, scores have been made which show almost incredible skill. Space forbids the publication of many of them but I will not resist the temptation to give a few, all of which are vouched for, on honor, by their makers and some of which were observed and scored by other people.

Dr. E. K. Roberts, on April 7, 1932, writes: "I have never kept a record of my practice scores except when I have had a number of friends shooting with me. I am able to find only the scores kept in 1930. The best of these and their dates I can give you and they follow: York 132-738, March 29; American 90-710, April 27; Metropolitan 148-1018, September 2."

Roy Lawhorne, of Santa Barbara, California, in the summer of 1930, shot ten consecutive American rounds of which the lowest was 700 and the highest was 732. They were reported in *The Eastern Archer* for August, 1930. Several Californians who knew him told me that they did not doubt their truth. The best two, by ranges, were: 236-238-258 = 732 and 238-240-252 = 730. He once shot thirty-two Americans of over 600 in succession.

Russell Hoogerhyde writes on October 3, 1932: "Last winter I shot five Americans over 700, the highest being 716. My highest York is 738, but I do not often shoot Yorks in prac-

tice." He premises these great figures by saying with his usual modesty, "I have not shot any outstanding practice scores." One of his Americans, of 704, is in my hands, with every arrow scored by J. B. Tomlin, Jr., of Atlantic City.

Ralph H. Miller, in two letters of July, 1932, said that "last summer" (1931), when he was fifteen years old, he shot Americans of 702 and 706 and a York of 725. In an effort to make a special score for this book he shot a York on July 12, 1932, of which the record of every arrow lies before me, of 60-298, 46-248, 24-160 = 130-706. Ralph is not only vouched for personally by everyone who knows him, but his superb performance in taking second place among the men in the 1932 N. A. A. tournament puts his ability beyond question.

In the chapter on British archery, I mentioned the York of 137-809 which Horace A. Ford accredited to himself as a practice score. Whether it were made at one target or at two is not known. It may have been shot in either manner, since most people, in private practice, shoot for convenience in only one direction. On exactly the same sort of authority, the word of the gentleman archer, I report the highest York of which I have any knowledge and which I believe to be the world's best.

G. Wayne Thompson, of Sunnyvale, California, on October 3, 1931, at Portland, Oregon, shot a single York of 67-363, 48-294, 24-168=139-825. I have the original score card with his written oath that it is genuine. He is personally vouched for by Cassius Styles and other well-known archers. In letters he said: "The score was witnessed in part by Homer Prouty. I can assure you, however, that it was recorded exactly as shot, without any practice ends and with bows and arrows of my own make.—The first time I ever shot at a target was at the state fair shoot in Sacramento in 1930. I made a score of 230 in the Metropolitan. I improved rapidly until last October, since when I have averaged

about 600 in both American and York. Some of my best scores are: American 700-694-688-680-676; York 825-758-742-725. I had two bows during that time. One of them is a 46 lb. 6 ft. bow which I used for 100 yards. The other was a 38 which I used for all other ranges. The arrows were 29 inch Port Orford cedar footed with amaranth, weighing 395 grains. I was twenty-six last November."

It is difficult to refrain from mentioning many other archers whose achievements are almost equal to those cited above, so let no one feel slighted if he seem to have been unjustly left out.

### THE SIX GOLDS CLUB

At the Annual Business Meeting of the National Archery Association in 1931, it was voted to establish an honorary group called the Six Golds Club, membership in which would automatically accrue to any archer who made a perfect end of 6-54 at any range in a recognized archery tournament. In 1932 the word "recognized," in the foregoing sentence, was defined to mean any major tournament of a club that was affiliated with the N. A. A., or any major tournament of any association of clubs which complied with the requirements of the N. A. A.

So far as is known, the first perfect end that is known to have been made in a tournament of the N. A. A. was by Dr. Roberts at forty yards in 1928.

At the present time, the rapidly growing membership is as follows:

<i>Name</i>	<i>Tournament</i>	<i>Range</i>	<i>Year</i>
Russell Hoogerhyde .....	Missouri Valley A. A....	60	1932
H. B. Hubbell, New Rochelle, N. Y.	Metropolitan A. A. ....	50	1932
Gertrude Roach, Buffalo .....	National A. A. ....	50	1931
D. H. Cole, Rome, N. Y.....	Rome Archery Club ...	40	1927
Dorothy Duggan, Greenwich, Ct...	National A. A.....	40	1931
Francois X. Goulet, Los Angeles....	The Edison Archers ....	40	1932
Roy Lawhorne, Santa Barbara.....	National A. A. ....	40	1929
Donald Mackenzie, Greenwich, Ct...	Westchester Co. A. A....	40	1931



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<i>Name</i>	<i>Tournament</i>	<i>Range</i>	<i>Year</i>
William J. Mattox, Toledo, O. ....	Michigan A. A. ....	40	1931
Ralph H. Miller, Seattle. ....	Western A. A. ....	40	1932
Dr. E. K. Roberts, Ventura, Cal. ...	National A. A. ....	40	1928
Stanley F. Spencer, Seattle. ....	National A. A. ....	40	1929
Carl G. Thompson, Pinehurst, N. C.	Mound City Dist. A. Fed.	40	1930
William L. Wilcox, So. Egremont, Mass. ....	Eastern A. A. ....	40	1931
Mrs. Dorothy S. Cummings, New- ton Centre ....	National A. A. ....	30	1931
Ilda Hanchette, Los Angeles. ....	National A. A. ....	30	1932
Betty Gene Hunt, Los Angeles. ....	National A. A. ....	30	1930
Mrs. Helen Meade Little, Los Angeles	National A. A. ....	30	1932
Madaline Taylor, Newton Centre...	Metropolitan A. A. ....	30	1932

## XVII

### GLOSSARY

This glossary is the result of researches that I made for *Webster's New International Dictionary*, as Special Editor for Archery, and the definitions are just as they appear in that monumental work except that some of them are given here in fuller forms.

I would strongly urge all archers to learn these words and to use them with freedom. It should be our duty to see that such pure old English speech, which is our rightful inheritance, should not be ousted by current terms of the rifle range or golf course.

aim, *n.*

1. A mark at which an arrow is aimed.

"Schomely to schort he schote of his ame."—*Early English Alliterative Poems*. C. 128. (1325.)

"A garish Flage to be the ayme of euery dangerous Shot."—*Shakespeare*. *King Richard III*, Act IV, Scene IV, line 90.

2. The pointing of an arrow in the correct trajectory for hitting a mark.

"To cleue his heid the king made ame."—*Syr Genevrides*, line 5959. (About 1430.)

3. Guidance given.

"Ayme for Finsbury Archers." (1594.)

"We know without your ayme, good woman."—*Fletcher*. (1625.)

aim, *v. t.* To endeavor to direct an arrow in the correct trajectory for hitting a mark.

"and eymede ful euene to gyue the strok."—*Sir Ferumbas*. (1380.)

aim-crier. One who *gives aim*, *q. v.*

"Like Ayme-cryers, they stand and direct him a neerer way to his owne mark."—*F. Markham*. (1622.)

allow, *v. i.* To aim an arrow to windward to compensate for drift, or windage.

allowance, *n.* Divergence in aim to windward to compensate for drift.

American round. See *round*.

archer, *adj.* Pertaining to an archer or archery.

"Little could avail their archer craft."—*Morris, Earthly Paradise*. (1870.)

"They rushed among the archer ranks."—*Scott, Lord of the Isles*. (1814.)

archer, *n.*

1. A *bowman*; one who shoots with, or is skilled in the use of, the bow and arrow.

"Thair archaris furth to thame thai send."—*Barbour, Bruce, IX, 151*. (1377.)

"Of xvc archars of ynglonde went a-way but vij<sup>x</sup> & thre."—*Ballad of Chevy Chase*. (About 1465.)

2. An arrow. Perhaps this meaning is by confusion.

"One of them, with a bow and archer, smote sir Gawaine."—*Malory, Prince Arthur*. (1470-85, but modern spelling.)

3. An old name of the bishop in chess.

"A Bishop, or Archer, who is commonly figured with his head cloven."—*F. Beale, Chesse-play*. (1656.)

4. The zodiacal constellation of Sagittarius.

"Sagittarius, that is to say, the Archer—hath his head towards the North."—*Blundevil*. (1594.)

5. A fish, found in Java and Sumatra, which has the power of shooting a drop of water at insects that rest near.

archeress, *n.* A female archer.

"To thee I recommend it, O archeress eternal!"—*Fanshawe, Pastor Fido*. (1646.)

archeria, *n.* In medieval fortification, an aperture or loophole through which archers might shoot.—*Century Dictionary*.

archership, *n.* Skill as an archer.

archery, *adj.* Pertaining to archery; as archery expert, archery tackle.

archery, *n.*

1. The art, practice or skill of shooting with a bow and arrows.

2. An archer's outfit of weapons and appurtenances.

"Archerye, sagittaria, arcus."—*Prompt. Parv.* (1440.)

3. Archers collectively.

"With suar speares off myghtte tre  
The cum in on every syde;  
Thrughe our Yngglishe archery,  
Gave many a wounde full wyde."

—*Ballad of Chevy Chase. Percy's Reliques.*

4. A feudal service.

"Archery was a Service of keeping a Bow for the Use  
of the Lord, to defend his Castle."—*Blount. Law  
Dict.*

archer's rood. = *rood*.

archer's stake. See *stake* 2. "8 bundles of archers stakes in  
Pontefract Castle."—*Grove*.

archery ground. A rectangular field with targets and marked  
shooting points.

arm, *n.* = *limb*.

"Notches on the ends of the arms."—*Archers' Register, 1912, 242.*

armguard, *n.* = *bracer*.

arming, *n.* The covering, as plush, leather, tape, etc., of a bow  
handle.

arrow, *n.* A missile weapon of offense, straight, slender, with  
sharp or blunt end, and usually feathered and tipped, to  
be shot from a bow.

arrow case. A closed receptacle for arrows, either stationary or  
portable, like a hand bag, and preferably with a support  
for each shaft. See *crib*.

arrow crest. = *crest, n.*

arrow foot. = *foot, n.*

arrowhead, *n.* The striking end of an arrow, usually a separate  
part fastened to the stele.

arrow guide. A grooved piece of horn, or other hard material,  
attached to the bow or hand, to guide a short arrow  
which is drawn through the bow.

arrow plate. A bit of leather, shell, bone, etc., set just above the  
handle of a bow to receive the chafing of the arrow.

arrow release.

1. = *loose, n.*

2. The arrangement of the drawing hand and fingers in  
shooting.

See *primary, secondary, Mediterranean, Asiatic, Mongolian and Oriental release.*

arrow rest. A shoulder of horn or metal on some bows, especially French or Belgian, used instead of the fist to support the arrow.

arrowshaft, *n.* = *stele*.

arrowsmith, *n.* A maker of metal arrowheads.

"The 7 Henry IV. complains of the negligence of the arrow-smiths, and ordains that the heads of arrows shall in future be well boiled and brazed."—*Moseley*, 234.

arrow stave. A slender wooden rod ready to be made a stele.

arrow straightener. An instrument used from Paleolithic times to the present day for removing bends from an arrow-shaft which has been heated to make it retain a permanent set. It is usually a long piece, or rod, or slat of wood, bone, horn or ivory, pierced near one end with a hole perhaps as big as a finger.

artiller, *n.* A maker of artillery, in the original sense of that word, that is, a bowyer.

"The said inhabitants Artillers myght competently lyve upon suche stuff as they than bought of Bowestaves at xl s. the C."—*An act of Richard III*, xi. (1483.)

artillery, *n.*

1. Originally, bows and arrows.

2. Later, all projectile weapons.

Ascham used the word 22 times in *Toxophilus*. 21 times it referred exclusively to bows and arrows and once to guns and bows. In the last instance, given below, I believe the meaning to be, that, nowadays the word stands for two things instead of for one, as in the past. As Ascham was only 30 years old in 1545, when *Toxophilus* was printed, we may infer that the popular extension to include firearms had come in just before that date. Clearly he had grown up in the belief that artillery meant the weapons of archery.

In the Scriptural passage quoted, artillery is mentioned as applying to the bows and arrows with which Jonathan had been signalling to David. It is not used again in the whole Bible.

"That fletcher is an enemy to archers and artillery, which cannot be content that an archer knowe a shaft."  
—*Ascham*.

"There is no one thinge so profitable belonging to artillerie, . . . than is a fit heade."—*Ibid*.

"what stronge and fearful bowes the Grecians used: whereby it is playne that artillerye was the thinge wherin both Europe and Asia in those days trusted most upon."—*Ibid*.

See, also, citation under *bearing gear*.

"Yet of all weapons the best is where with least daunger of ourself we maye hurte our enemye most. And that is, as I suppose, artillerie. Artillerie, now a days, is taken for two things: gunnes and bowes, which, how much they do in warre, both daily experience doth teach and also Peter Nannius."—*Ibid*.

"And Jonathan gave his artillery unto his lad."—*I Samuel 20: 40*.

ascham, *n*. A tall narrow locker, or box, for bows and arrows.

Asiatic loose. = *thumb loose*.

Assyrian bow. The unique wooden bow shown in Assyrian sculpture, about  $4\frac{1}{2}$  feet long, of nearly one diameter throughout and with straight limbs but sharply bent in the middle to form a curved obtuse angle. When drawn it became almost semicircular.

back, *n*.

1. The outer side of a bow. See *belly*.
2. A strip of elastic material, as wood or sinew, glued or otherwise fastened to a belly on the side away from the archer.

back, *v. t*. To attach a back to a belly. See *back, n. 2*.

backed bow. A bow whose back and belly are different pieces joined together.

backing.

1. Material from which a back is made.
2. The mode of attaching a back. See *free backing, close backing*.

balloon feather. = *parabolic* or *swine-backed* feather.

barb, *n*. A point that stands backward in an arrowhead to prevent its being easily extracted. See *beard, n*.



barbed arrow. An arrow whose head is furnished with a barb or barbs.

barrelled arrow. An arrow thickest in the centre and tapering to the ends.

Cf. *chested arrow*.

bass, *n.* The mat of straw forming the back of a target.

"bowmen . . . who twist them out of the target-bass by grasping at the feathers."—*Hansard*, 79.

bast, *n.* = *bass*.

"The said targetts shall be sett in some open and plain field upon two straw basts or matts."—1673 *meeting of Scorton Arrow Society*.

battle bow. A strong bow for warfare. *Biblical*.

"and the battle-bow shall be cut off."—*Zech.* 9: 10.

beard, *n.* The barb of an arrow. *Rare*.

"an order for arrows which directs that the wings or beards of the heads shall be made large."—*Roberts*, 172.

bearded arrow. = *barbed arrow*.

"Luckily it was not a bearded arrow."—*Hansard*, 398.

bearing arrow. An arrow carried for military use, or of the heavy sort used in warfare. A *livery arrow*.

"Cloudesly with a bearyng arowe

Clave the wand in two."—*Ballad of William of Cloudesley*.

The meaning of the citation, which is not generally recognized, is that he used a sharp, armor-piercing, heavy arrow. *Bearing arrow* is elsewhere always defined as an arrow of steady flight, which is not the real sense. A light arrow will not split a peeled hazel wand at 100 yards.

bearing bow. A bow carried for military use; hence, a strong bow of good cast.

bearing gear. Weapons carried for military use, or of the sort used in warfare.

"Such hastinesse (of manufacture) may also be founde amonge some of them which worke the Kinges artillerye for warre, thinking, if they get a bow or a sheafe of arrowes to some fashion, they be good enough for bearing gere."—*Ascham*.

belly, *n.* The inner side of a bow, which is nearest to the archer when he bends it.

bend, *v. t.* To brace, not draw, a bow.

"Penelope brought Ulixes bowe downe amonges the gentlemen, whiche came on wowing to her, that he whiche was able to bende it and drawe it, might injoye her."—*Ascham*.

bend, *n.* The space between a braced bow and its string.

"let your bowe have a good bigge bende, a shaftment and two fingers at the least."—*Ascham*.

bend bow. A long bow, as distinguished from a crossbow. Bend is here used in its ancient sense of something long and narrow, the same word as *band*. Cf. *benn*.

"He bar a bende bow in his hande,

Was made off trusti tre;

An arow that a cloth yarde was lang,

To the hard stele haylde he."

—*Ballad of Chevy Chase*. *Percy's Reliques*, 55.

bender, *n.*

1. A mechanical contrivance for bending, drawing up or setting crossbows.

"Cros-bows that are bent with a Bender."—*R. Waller. Nat. Exper.* (1684.)

2. A bow, in Kentish dialect, in phrase: "bender and arrs."—*Wright*.

benn, *n.* A colored silk sash. *Scotch*. It is the same word as English *band*, French *bende*, Old High German *binda*, and so on, all of which mean a ribbon or something else long and narrow.

"The prize shot for at the game of Papingo in former times was a piece of fine Persian taffatie, three ells long and three quarters broad, of several colours—red, blue, green, scarlet, &c.—to the value of twenty pounds (Scots) at least, which they termed a Benn."—*Badminton*, 215.

best gold. In an archery meeting, the shot nearest the exact centre of the gold, or any target; usually reckoned at the longest range.

bird or birding arrow. = *blunt*, *1*.

black, *n.*

1. The black, fourth circle of a standard target.

2. A hit in the black, counting 3.
3. Any dark mark shot at in rovers.  
 "If you find a bush or a black . . . you are to take the highest part therof for your place to measure at."—*Roberts*, 234.

blank, *n.*

1. = *white*, 5. A prick mark. Cf. *point blank*.  
 "Two centuries ago, they merely fixed a very diminutive *blanc* in the centre of the butt."—*Hansard*, 112.
2. The white centre of an old fashioned target.

blazon, *n.* A square target formerly used in Flanders. It is divided into 50 squares, the middle one counting 26 and the next values being in the corners. Beside each number is a square that counts 0.

blue, *n.*

1. The blue, third circle of a standard target. Formerly called *inner white*.
2. A hit in the blue, counting 5.

blunt, *n.*

1. Any arrow with a blunt tip. Generally used for killing small game without mangling it.  
 "It will sink a blunt between his eyes."—*Eastern Archer*.
2. An arrow for popinjay shooting, called in French *le maquet*, strongly bobtailed and swelling near the head so as to merge into a horn tip about an inch thick and flat faced.
3. In old English prick shooting, an arrow with a very large blunt or nearly blunt head, wider than the shaft, or stele. From the fact that they were deflected by wind we may surmise that some of them were of horn, as in modern Belgium where they are an inch or more in diameter and shaped like an onion or the cupola of a Russian church.

"The blont heades men use bycause they perceave them to be good to kepe a lengthe wyth all, they kepe a good lengthe bycause a man poulethe them no ferder at one tyme than at another for in felynge the plompe ende alwayes equallye he may lowse them. Yet in a wind and agaynste the wynd the wether hath so much power on the brode end that no man can kepe no sure lengthe wyth such a heade. Therefore a blont hede in

a caulme or downe a wind is very good, otherwyse none worse."—*Ascham*.

blunt arrow. = *blunt*, in all uses.

bobtail, *n.* An arrow decreasing in thickness from the pile to the nock.

"those that be little breasted and bigge towarde the heade, called by theyr likenesse Taper fashion, Reshe Growne, and of some mery felowes Bobtailes."—*Ascham*.

bobtailed arrow. A *bobtail*.

bolt, *n.* A short, thick arrow used in a crossbow. They are usually less than a foot long, as thick as a finger and vaned with wood, metal or the like.

bolt, *v. i.* To be loosed too soon; of an arrow.

bought, *n.* A twist or turn in the grain of a bow, bowstave or arrow stele.

bow, *n.*

1. A weapon made of a strip of wood or other elastic material, with a cord to connect the two ends when bent, by means of which an arrow is propelled.

2. A unit of measurement of six feet; divided into half-bows but no other fraction.

"The screffes men schot foll fast,  
As archares that weren godde,  
Ther cam non ney the marke  
Bey half a god archares bowe."

—*Robin Hode and the Potter*.

"No arrow can count which is not within five bows or ten yards of some part of the mark."—*Roberts*.

3. An archer, as a swordsman is a *blade*. Thus, high bow and low bow are the best and worst archers in a contest.

bow bearer.

1. One who carries the bow of lord or master.

2. Specifically: An officer of the chase in old England ranking next to the lord warden.

"George III was the last of our monarchs who required the performance of this ancient service. When he visited Lyndhurst in state, the Rev. Sir Charles Hill, Bart., attended him as bow-bearer, leading a brace of milk-white greyhounds."—*Hansard*, 289.

bowboy, *n.* To *bowman*, as boy to man. For citation see *pin*, *n.*

bow case. A sheath, of textile or leather, for a bow.

"A bowecase of ledder is not the best.—*Ascham*.  
(1544.)

bow cord. = bowstring.

bower, *n.* A rare form of *bowyer*, possibly Scottish since it is engraved on the medal for 1667 appended to the Mus-selburgh Arrow as "Alexander Hay, his Majesty's Bower."

bow hand or arm.

1. The hand, or arm, that holds the bow. For citation, see *to the bow*.

2. Figuratively: since the left hand, therefore, away from the correct place or opinion.

"somewhat on the bow hand of fair justice."—*Scott*.

bow horn. = *bow tip*.

bowman, *n.* An *archer*.

bow meeting. A competitive meeting conducted by a club; distinguished from a public meeting.

"The Hereford Bow Meeting Society." Established 1826.

bow nock. = *nock*, *n.* 1.

bow ribbon. A loop of ribbon fastening the eye of the string to the bow horn when the bow is unbraced.

bowshot, *n.* The distance traversed by an arrow shot from a bow. The extreme range of the ancient English longbow with flight arrows was probably about 400 yards, but with sheaf arrows military archers (as published in 1590) began to shoot at 160 to 240 yards. The longest modern shots are 482 yards (1795) and 462 yards 9 inches (1914) from Oriental composite bows, and 466 yards 10½ inches (1931) from an 80 pound self yew bow.

bowstave. A trimmed rod of wood to be made a bow.

bowstring, *n.* A *bowstave*. *Scotch*.

bowstring, *n.* The string of a bow.

"The fyre so fast upon hym fell,  
That hys bowstryng brent in two."

—*Percy's Reliques*, 106.

bowstring, *v. t.*

1. To strangle with a bowstring.

"Placing him upon his knees, they passed their bow-string once around his neck and drew tightly until their victim ceased to breathe."—*Hansard*, 134.

2. With a braced bow forced over a man's body, to draw the string and loose it against his back. (Heard by word of mouth but not verified in print. Elmer.)

bow tip. = *horn*, *n.* 1 and 2.

bow tire. Loss of cast in a bow from being held drawn too long.

bowyer, *n.* One who makes or sells bows.

brace, *v. t.* To fit a bow to shoot by bending it and tightening the string, either nocking the eye or, primitively, taking up and tying the slack.

bracer, *n.* (French, *brassard*.) A piece of stiff material, usually leather, fastened to the inner side of the lower arm and wrist of the bow arm to protect it from the bowstring.

brash, *adj.* Brittle, *frush*, *q. v.* (Local U. S.)

break, *n.* An open fracture in a bow or arrow; the opposite of a chrysal.

breast, *n.* The portion of an arrow, about a fistmele from the nock, which touches the bow when in position for shooting.

"in the breste where the weyghte of the bowe lyethe as you maye perceyve by the werynge of every shafte."  
—*Ascham*.

breasted arrow. = *cheded arrow*.

broad arrow.

1. An arrow with a broad head.
2. A conventional mark placed on British government stores.

broadhead, *n.* A flat, pointed arrowhead having sharp edges and two divergent posterior barbs.

"The one having two pointes or barbes, lokinge backward to the stele and the feathers, which surelye we call in Englishe a brode arrowe head, or a swalowe tayle."—*Ascham*.

bucket, *n.* = *well*, *n.*

bullet arrow. An arrow with a cavity in the end for throwing a bullet or small stone. It is often tied to the bow with a string and is used for very small game.



bull's eye. The gold.

butt, *n.*

1. A flat faced mound of earth, or structure of sod, pressed straw or the like, on which a prick or target is set; usually at moderate range.
2. Loosely; any mark or target.
3. In plural form, a range for target shooting:—the butts.
4. The rear end of a bolt or quarrel.

butt field. A field containing butts, usually for public use.

"Many closes of pasture land retain the appellation of butt-fields."

butt shaft. A target arrow. See *pin, n.* for citation.

butt shooting. Shooting at permanent butts at ranges of 30 to 120 yards; distinguished from *clout*, *roving* and *hoyle* shooting.

butty, *n.* An archer's companion or opponent at the butts.

"his partner (in Forest parlance his 'butty') taking his place."

bye-wood, or by-wood, *n.* The surplus wood taken off in making tackle.

"Your jack plane will be best for taking off the bye-wood."—*Duff*, 54.

cap arrow. An arrow with a very large flat head used in practice, as in China.—*Catalog of the Field Museum*.

captain of numbers. The contestant making the highest score.

"Captain of numbers means the archer who scores highest."—*Hansard*, 88.

carriage bow. = *jointed bow*.

"There is a bow called the carriage bow. It is made to divide in the centre by means of an iron or brass socket."—*Ford*, 21.

carry the shot. To have shot the winning arrow.

"Any person who shall touch the mark shall carry the shot before any other that does not touch or pierce, though he be nearer the mark."—*History of the Royal Company of Archers*, 51.

cast, *n.*

1. The distance a given bow can shoot.
2. The coefficients of resilience in a bow.
3. A side bend in a bow.

4. The right to shoot first, got by winning the last shot.  
 "He who gets the cast, names the next mark."—  
*Roberts, 235.*

cast, *v.*

1. To shoot.
2. To warp sideways.  
 "I founde my good bow clene cast on the one syde."—  
*Ascham.*

chest, *n.* = *breast.*

cheded arrow. An arrow thick at the breast, always tapering toward the point and usually toward the nock.

chrysal, *n.* (*kris'-al*). A transverse line of crushed fibres in the belly of a bow, beginning as a *pinch* but extending, with use, almost through to the back; a chrysal may develop in an arrow. A *fret*.

chrysal, *v. i.* To develop a chrysal.

"Yew bows being liable to chrysal."—*Roberts, 135.*

clock, *v. t.* A modern Americanism used as: "to clock arrows, or an arrow." By shooting arrows at a target, to determine their inherent deviation as plotted on a clock face. Example: 1st arrow hits 9 o'clock red, 2nd hits 6 o'clock blue, etc.

close backing. Backing glued fast and forming an integral part of the bow or bowstave, as distinguished from *free backing*.

clothier's yard. A clothyard.

"Draw mee a Cloathiers yard."—*Shakespeare, Lear.*

clothyard, *n.* The yard and inch, or 37 inch ell (cloth measure), abolished after 1553; known later as the Scotch ell—37.06.—*Weights and Measures, Encyclopedia Britannica.*

clothyard shaft. A 37 inch arrow, as used in medieval England.

clout, *n.*

1. A white rag, often stretched on a hoop or square frame, shot at by archers at long range.  
 "a would haue clapt ith clowt at twelue score."—*2 King Henry IV, iii, 2.* (From photo-lithographic copy of Quarto of 1600.)  
 "the targets in those days (1713) were—a square piece of canvas stretched on a frame without any backing."—*Badminton, 220.*

2. A white target of straw and canvas, 3 feet in Scotland, 2½ in England, placed at 160-240 yards.
3. A hit in the clout.  
 "A foot is indicated by (the marker) striking his feet, thumbs by the hands united over his head, and a clout sends him on his back as if shot."—*Badminton*, 249.
4. In plural form, a range for clout shooting:—the clouts.

clout shoot. In America, a round of 36 arrows shot at a 48 foot target marked on the ground around a clout, the proportions of the rings being those of the standard target scaled a foot to the inch and the ranges being 180 yards for men and 120 for women.

clout shooting. Shooting at a clout at long range.

clout shot. A shot over long range at a clout.

cock feather. The vane at right angles to the nock.

"The cocke feather is called that which standeth above in right nocking."—*Ascham*.

Columbia round. See *round*.

come, *v. i.* To curve when drawn:—of a bow.

"Looke where he (one's bow) cometh most."—*Ascham*.

come compass. To curve in a regular arc when fully drawn:—of a bow.

"in drawing it must come rounde compasse."—*Ascham*.

compass, *n.*

1. The extent of an arrow's flight.
2. The curve of an arrow's flight.
3. The elevation determining the above.  
 "houldinge your hand ever of one height to kepe true compass."—*Ascham*.
4. A circle or the arc of one.  
 "Sometime it (wind-driven snow) ran round about in a compasse."—*Ascham*.  
 "if it fly far, it flyeth a rounde compasse."—*Ascham*.
5. Equal extent, in general.  
 "The long heade is worse for the maker to file straight compasse everye waye."—*Ascham*.

composite bow. A bow of two or three layers of materials, usually having a centre of wood, belly of horn and back of sinew.

continuous draw. A draw without pause to the position for loosing. Cf. *Interrupted draw*.

coul, *v. t.* (Compare *coulter*, or *colter*, the cutting blade of a plow.) To trim or shape by cutting, as the web of an arrow feather.

"The younge goose feather is weake and fyne, best for a swift shaft, and it must be couled at the first sheering, somewhat hye, for with shootinge it will saddle and faule very much."—*Ascham*.

"in coulinge or sheeringe, whether highe or lowe."—*Ascham*.

courb, *n.* A crook or hump in a bow or elsewhere.

"He had a courb upon his back."—*Gower*. (1393.)

courb, *v. t.* To bend or curve. Duff says it was used by Scottish bowyers.

"Yea courb and woe, for leave to do him good."—*Shakespeare, Hamlet*.

cradle, *n.* A device on the string of a stone bow to hold the missile. A *purse*.

"In the middle of this cord was a contrivance for holding the ball, called purse or cradle in English; in French, *la fronde*, or the sling."—*Hansard*.

creased head. = *silver spoon head*. Dialectic equivalent of *crested*. Cf. *crest, n.*

crest, *n.* On an arrow; an identifying mark near the vanes, commonly of painted rings.

crest, *v. t.* To paint a crest on an arrow.

crib, *n.* A low box topped with netting or perforated board in which to stand arrows so the feathers will not touch.

"Then he stands the shafts in a crib or rack."—*Duff*, 127.

crossbow, *n.* A weapon formed of a bow set crosswise on a stock.

crossbowman, *n.* One whose weapon is a crossbow.

crossbow arrow. A short arrow for use in a crossbow, longer and more slender than a bolt.

crow bill. A horn pile.

crown clod. An ornament of turf, usually urn shaped, surmounting an archery butt.

"Crown clods, that is to say, three pieces of sod rudely

cut into the form of an urn, give a finish to the modern butt."—*Hansard*.

cry aim. = *give aim*.

The Oxford English Dictionary defines *aim-crier* as *one who gives aim* but, strangely, does not give a corresponding definition of *cry aim*. Instead of venturing an original opinion it quotes Nares thus: "To encourage the archers by crying out *Aim* when they were about to shoot." In most editions of Shakespeare it is defined as *to encourage*, in a footnote to the following quotation from *King John*, II, I:

"CONSTANCE. Ay, who doubts that? a will! a wicked will!

A woman's will; a canker'd grandam's will!

KING PHILIP. Peace, lady; pause, or be more temperate:

It ill beseems this presence, to cry aim  
To these ill-tuned repetitions."

I do not think that such an interpretation is justified. To me the figurative sense of *giving aim* is clearly meant; King Philip indicating that the presence of the king is no place to tell how near to the mark of truth are Constance's shafts of repartee.

"Giving or crying aim . . . merely alludes to the marker's office."—*Hansard*, 113.

curl, *n*. A sudden turn in the grain of the wood.

cut the mark. In falling short, to cross the mark;—of an arrow.

damp sap. A bluish line between the heart and sap of yew wood.

dead loose. A loose in which the drawing fingers are relaxed gradually while freeing the cord, thus robbing the bow of some tension and reducing its cast. A *sluggish loose*.

dead shaft or arrow. An arrow lacking in spine, especially the quality of spring or resilience.

"Brazell, Turkie woode, Fusticke, Sugar cheste, and such like, made dead, heavye, lumpishe, hobbling shaftes."—*Ascham*.

dip, *n*. An abrupt, but curved, lowering of the belly of a bow at each end of the handle. For citation, see *hard handled*.

direction, *n*. Line of aim.

double end. A pair of single ends at two facing targets or butts.

double head. An arrowhead for hunting and warfare, shaped like a new moon with the concave edge forward and sharp.

double nock. "And double nockinge is used for double suertye of the shafte. And thus farre as concerninge a hoole steele." Thus said Roger Ascham, and left behind him one of the most puzzling problems of toxophily. What was a *double nock*? The paragraph begins: "The nocke of the shaft is diversely made, for some be great and full, some handsome and litle; some wyde, some narowe, some deepe, some shalowe, some rounde, some longe, some with one nocke, some with double nocke, whereof every one hath his propertye." In this list of contraries, for *double nock* to be contrasted with *one nock* must mean that it was two notches, and not merely a butt of double thickness. I once thought I had solved the riddle by applying the hypothesis of a nock-piece set in a notch of the stele, thus making a nock within a nock, or a double nock. This, indeed, is still the only explanation, occurring to me, that has any reasonableness, but doubt is cast on it by the statement that a double nock is part of a *hoole* (whole) *stele*. A later sentence would seem, at first sight, to cover the use of a nock-piece, but careful reading shows its meaning to be limited to a sort of footing of the butt end, not to the insertion of a slip of strengthening material. It is:—"Some use to peece theyr shaftes in the nocke with Brazell or Hollye to counterwey with the head, . . . and I thincke such peecinge came uppe first, thus: when a good archer hath broken a good shaft, in the feathers, and is loth to leese it, he therefore doth peece it." Roberts, in 1801, confesses that the double nock is unknown to modern archery and surmises that it might have been a cross nock.

double round. A round made up of two identical single rounds.

double targets. Targets at both ends of the range.

down wind. A wind blowing from the archer to the mark.

draw, *n.*

1. The manner and technique of drawing; as, a quick draw, a finger draw.
2. The distance from the string to the back of a drawn bow.

draw, *v. t.* To pull the string of a bow as for shooting.



draw a feather. To strip its web from the shaft.

draw home. To draw an arrow to the head and into position for loosing.

draw through a bow. To draw an arrow so far that the head passes the belly.

drawing fingers. The first three fingers of the shaft hand.

drawing hand or arm. The hand or arm that draws the string.

"Ones I saw a man which used a bracer on his cheek, or else he had scratched all the skinne of the one syde of his face with his drawing-hande."—*Ascham*.

drawing glove. = *shooting glove*.

drawing point. The place to which the nock of the arrow is drawn when shooting. Sometimes wrongly called "anchor."

drawing thumb. The thumb which draws the bowstring in the Oriental manner.

drib, *v. t. and i.* To shoot inaccurately. The word is allied to *drip* and *drop*.

"Behold how hee . . . dribs his arrowes up and downe at birds."—*Golding*. (1565.)

"At rousers they but shot theyr Shafts, and dribbed wyde a skore."—*Churchyard*. (1572.)

dribber, *n.* An archer who dribs his arrows.

"he shall become of a fayre archer, a starke squyrter and dribber."—*Ascham*.

drift, *n.*

1. = *windage*.

2. A volley of arrows, especially when aimed high in the air.  
"The disorder or routing of an enemy which is caused by the bowmen, cometh from the fearful spectacle of a drift of arrows; for a shower of arrows is so terrible to the eye."—*Roberts*, 56.

ear, *n.* The stiff, reflexed end of an Oriental composite bow.

"When an Oriental wishes to string his bow, he places himself firmly on his centre, and grasping the upper ear (note): The curved extremity of an Indian bow is so named by their bowyers. 'The man provided himself with several little rods, about the length of the ears of a bow.'"—*Hansard*, 135.

elevation, *n.* The inclination of a drawn arrow in a vertical plane.

ell, *n.* A clothyard.

"An arrowe of an elle longe,  
In hys bowe he it throng,  
And to the head he gave it hale."—*Hansard*, 59.

end, *n.*

1. The place where a mark is fixed.
2. A unit of shooting from either end of the range in England, from one end in America and on the Continent.
3. The number of arrows shot in one such unit by one archer;—three in England, six in America and one on the Continent.

English loose. = *Mediterranean loose* or *finger draw*.

eye, *n.* A thick loop at one end of a bowstring, twisted in the making, not tied nor spliced. See *noose*.

face, *n.*

1. The French equivalent for *belly*; often used politely in English.
2. = *target face*.

fast, *exclam.* A call of warning to one about to pass in the line of an arrow's flight. Do not use the Scotch golfing term *fore*.

"speke thys usuall worde commonly used to be spoken before he or they shote, that is, to say this worde Faste."—*Patent of Gylde of St. George*. 29 Henry VIII.

feather, *n.*

1. A feather in the ordinary sense.
2. A finished arrow vane.
3. A layer of the grain in yew or similar wood.

feather, *v. t.* To fletch an arrow, or fit it with vanes.

feathering, *n.* The feathers of an arrow. The *fletching*.

feather in, or into. To shoot an arrow in as far as the feathers. The phrase is said to be dialectically extended to firearms.

"The breech of such a varlet should have been nailed to his bum with one arrow, and an other fethered in his bowels."—*Description of England*. William Harrison.

ferrule bow. A jointed bow with a union like that of a fishing rod.

field arrow or shaft. A strong roving arrow.

field captain. The presiding officer of a tournament.

finger, *n.* A measure of the breadth of the finger, about .7 inch.  
For citation see *bend, n.*

finger draw. Drawing with the fingers without the thumb.

finger stall. = *finger tip.*

finger tip. A leather thimble to protect a drawing finger.  
"Finger tips were at one time known as knuckle tips."—*Duff, 152.*

Finsbury Fields. Famous shooting fields of London, protected by royal patent and in use till 1791, containing about 200 rovers.

fire a bow. An incorrect expression for *shoot a bow*. There is no fire in a bow.

fire arrow or shaft. An arrow bearing a flaming substance to set its mark afire.

"the invention of fire-shafts for longbows."—*Roberts, 17.*

first gold. In an archery meeting, the first shot in the bull's-eye on any target.

fish, *n.* A joint to form separate limbs into a bow or bowstave by fitting and gluing a wedge end into a V-slot, = single fish, or a double wedge into a W-slot, = double fish, the cuts being antero-posterior.

fish, *v. t.* To form a fish joint.

fishing arrow. An arrow for shooting fish, usually with a slender, barbed head.

fish joint or splice. = *fish, n.*

fishtail, *n.*

1. A hobbling arrow. (Note: I think this word was coined at Seattle in 1910 during a match between Will Thompson and Harry Richardson.)

2. A point of a fish splice.  
"then cut the fishtails out with a tenon saw."—*Duff,*

fistmele, *n.* (mele = measure. *e. g.* meal is measured grain or measured eating.)

1. The breadth of a fist with the thumb stuck out, about 6 to 7 inches. Used to give correct height of string from braced bow.

"It is a pure Saxon word, meaning the measure of the clenched hand with the thumb extended."—*Hansard*, 379.

2. The breadth of the hand, or *hand* = 4 inches. Probably the original meaning.

five points. Ascham's "five points" are best understood from his own words: "Standing, nocking, drawing, holding and lowsing (loosing) shall bring you at the last to excellent fayre shootinge."

flane, *n.* An arrow. (Saxon—*flan*.)

"As from his bow a fatal Flane,  
Trained by Apollo from the Plain,  
In water pierced an eel."

Written in 1726. *History of the  
Royal Company of Archers.*

flat arrow. An expression denoting low trajectory; as, the bow shoots a flat arrow.

"The superior cast that throws the flat or low-flying arrow."—*Duff*, 64.

fledge, *v. t.* = *fletch*.

fledging, *n.* = *fletching*.

fletch, *v. t.* To fit an arrow with vanes.

fletcher, *n.*

1. One who fletches arrows.

2. An arrow maker. This is the usual sense, as in Ascham. "to make a bowe or a shaft, which belongeth to a bowyer and a fletcher."—*Ascham*.

fletchery, *n.* The wares or goods made or sold by a fletcher.

"They brought store of fletchery to them."

—*Poem of Dr. Faustus*.

fletching, *n.* = *feathering*.

flick, *v. i.* = *flirt*.

flight, *n.*

1. A flight arrow.

2. The power of flight or range of an arrow.



## STUNTS

GEORGIA COLEMAN DIVING (*Wide World Photos*)  
 HOOGERHYDE RISKING MANSLAUGHTER  
 HOWARD HILL'S PHYSICAL PERFECTION (*Wide World Photos*)  
 MOULD BREAKING SEAY'S CLAY PIPE  
 HOOGERHYDE'S LIMBER SPINE





3. A volley of arrows. See *drift* and *shower*.

4. A contest at flight shooting.  
"challenged Cupid at the flight."

flight arrow or shaft. A light, low-feathered arrow for flight shooting.

flight bow. A strong bow to shoot the greatest distance.

flight shoot. A competition in flight shooting. In America there are two kinds, the *regular*, or common style, and the *free-style*, where the feet may be braced against the bow, or any other method of shooting used which does not employ mechanical traction. Six arrows are allowed in each.

flight shooting. Shooting for the greatest distance without regard to aim.

flight shot. A shot for distance only.

flirt, *v. i.* To give a sudden jump out of the line of correct flight;—said of an arrow. See *flick* and *start*.

flo, *n.* *plural* flone. An arrow.

"His bowe he bent and in it sette a flo."—*Maunciple's Tale. Chaucer.*

float, *n.* An instrument formerly used by bowyers, now borne as one of the charges on the arms of the Bowyers Company of London. It seems to have been a broad but short file with high rasp teeth. The back was smooth and provided with a handle like that of a flat-iron but high in the rear and low in front.

Flower. A proper name which I believe to be derived from *flo*, possibly through an intermediate form of *floyer*, as *bowyer* is from *bow*. It should mean an arrow maker. Cf. *foyer*. I have never found any literary proof.

fluted arrow. An arrow scored in lines to prevent warping. Still used in Belgium.

follow the string. To become curved from use;—of bows.

"A bow which follows the string is least hurt by the string breaking."—*Ascham.*

foot, *n.*

1. A piece of hard wood wedge spliced, as the fore part of an arrow shaft, on soft wood for balance and strength.

2. In Scotland, an arrow which strikes the leg of a clout

stand; in England, one within 12 inches of the clout.  
For citation, see *clout*, 3.

foot, *v. i.* To splice with a footing.

foot bow. A very heavy bow shot from a sitting posture, braced against the feet and drawn with both hands. Sometimes two men were required.

footed arrow or shaft. An arrow having a spliced fore end of hard wood.

footing, *n.* Material for a foot; hence, a foot.

forehand, *adj.* Seen above the bow hand. Cf. *forehand shaft*, *underhand*.

forehand shaft. An arrow shot with the mark seen over the bow hand.

"the fore hand must have a bigge breste to beare the great might of the bowe."—*Ascham*.

"and carried you a forehand shaft a fourteen, and fourteen and a half, that it would have done a man's heart good to see."—2 *King Henry IV*, iii, 2. *Shakespeare*.

foreshaft, *n.* A prolongation of a true arrow shaft by an added rod, usually thinner and of hard wood, which is not drawn past the bow.

fork head. An arrow with two, rarely three, prongs pointing forward.

"The other having two pointes stretchinge forward, and this Englishmen do call a forke heade."—*Ascham*.

"Hercules used forked heades, but yet they had three pointes or forkes, when other mens had but two."—*Ibid*.

forker, *n.* An arrow with a fork head.

"The forker is a bifurcated arrow."—*Hansard*, 255.

forlorn hope. A vanguard; an advanced body of troops.

In Webster this meaning is not included, the only definition being of a body of men selected for a dangerous bit of duty. This is a perversion of the true sense, which was not of hope lost but of a heap, or body, of men lost, or separated from the others. A *fore loosed heap* would be an English analogue suggesting the original Dutch or Flemish.

"to incorporate compertiments with compertiments for the forming of batailles with sleeues, wings, and

forlorne hopes, as aforesaid."—*Certen Discourses. Smythe.*

"forme their squadrons with sleeues, wings, troupes, or forlorne hopes."—*Ibid.*

foylor, *n.* On the authority of James Duff this word is in traditional use among Scottish fletchers to mean a maker of arrows, the word *fletcher* being more properly restricted to the featherer of arrows. I may say that Duff used it quite naturally in conversation with me the first time I heard it and, though I can find no mention of it in any Scottish or English dialectic dictionary I feel that its resemblance to the old English *flo* and possibly to the German *pfeil* make it of great etymological interest.

free backing. Bow backing that is not glued on so as to form an integral part of the bow, such as the plaited sinew backing of Esquimaux bows. See *close backing*.

fret, *n.* A chrysal.

"Freates be in a shaft as well as in a bowe, and they be much like a canker, creepinge and increasing in those places in a bowe, which be weaker then other."—*Ascham.*

"Freates be first little pinches, . . . and so the pinches shall dye, and never encrease farther into freates."—*Ibid.*

frush, *adj.* Brittle. (Scottish and North English.)

"O wae betide the frush saugh wand."—*Minstrely. Scott.*

gad, *v. i.* To fly erratically; of an arrow.

gadding arrow or shaft. An arrow of erratic flight.

gaffe, *n.* A lever to bend a crossbow.

gall, *n.* A lesion in wood, as by abrasive trauma or about a knot.

"The shaft must be made rounde, nothing flat, without gall or wemme."—*Ascham.*

game, *n.*

1. Archery of any sort as a contest.

2. The number of points necessary to win, as in rovers or elsewhere.

garland, *n.*

1. *Anciently and correctly:* The distance from any prick or mark within which an arrow must hit to be counted. See *prick, n.*, *i.*, and *scantling, n.*

"The second shoote had the wightye yeman,  
 He shote within the garlande:  
 But Robin he shott far better than hee,  
 For he clave the good pricke wande."

—*Robin Hood and Guy of Gisborne.*

2. The ring on a butt or target, about a prick, within which an arrow must hit. See *prick*, *n*, 3. *Halliwel.*
3. *Modern*: Sometimes, from mistaking the original meaning, a wreath of flowers placed, as above, about a prick.

give aim. For a marker to signal to the archer the result of each arrow.

"one thing which many archers use . . . is ame gevinge."—*Ascham.*

= *cry aim.*

gizzen, *n.* = *shake*, *n.*

gizzen, *v. t.* To crack, or check, longitudinally in seasoning.

"The wood o't was gizzened and frush."—*Dr. Duquid. Service.*

gold, *n.*

1. The golden bull's-eye of a target.
2. A hit in it, counting 9; as, to make a gold.

goolail, *n.* A stone bow.

"In the East these bows are known under the name of goolail, a word corrupted from some Indian language.—*Field Museum Catalog.*

gone arrow. One which has passed above the mark. An *over arrow*.

grafted bow. A *spliced bow*.

grain, *n.* The arrangement, nature and quality of the fibres of wood.

grasp, *n.* A thin piece of wood glued to the back of a bow to round out the handle.

"The addition of the grasp may wait until the maker has satisfied himself how the bow is going to behave."

—*Duff, 64.*

grease box. A small box of grease for making the finger stalls slippery.

green, *n.*

1. The range or shooting ground.
2. A missed arrow which hits the *green*, or ground.

3. The petticoat.

4. A hit in the petticoat. See *spoon, sous*.

grip, *n.*

1. A bow handle.

2. A mode of grasping a bow; as, hard grip, loose grip.

ground mark. See *roving mark*.

half bow. A measure of three feet. See *bow, n. 2*.

hand bow. A bow as distinguished from a foot bow or cross-bow.

handfull, *n.* A measure of 4 inches, a *hand* as in horse measure.

handle. The part of a bow which is grasped in the hand.

hard handled. Said of a bow which does not play in the grip.  
 "Buchanan's dip, placed in the belly at either side of the handle, produced a new class which became known as hard-handled bows."—*Duff, 10*.

harrow, *n.* A herse.

He! He! On the excellent authority of Roberts, in his *English Bowman*, this is the archers' call, come down from ancient days. If the early English pronunciation of the letter "e" be considered it is the same as our modern and common Hey! Hey!

head, *n.* = *arrowhead*. See *point, pile, tip*.

head, *v. t.* To fit with an arrowhead.

head maker. A maker of arrowheads. Usually identical with *arrowsmith*, but applicable also to the maker of heads of stone, wood, horn, bone, etc.

"the heade makers of Englande shoulde make theyr sheafe arrow heades more harder pointed."—*Ascham*.

heat, *v. t.* To temper wood by fire.

height of a bowstring. Its distance from the belly of the braced bow. See *fistmele*.

hen feather. This word is the bastard offspring of ignorance. It was coined a few years ago, in America, as a name for the shaft feathers in distinction from the cock feather. The cock feather is so called because it is cocked up, not because it is erect like a proud rooster. The word should be squelched.

Hereford round. See *round*.

herse, *n.* An old military formation of archers, probably in the shape of a phalanx with enough space between the men for shooting. Originally the word meant a crossed structure of poles; thus a hearse for the dead was a stretcher and in French a herse is a harrow. In the military formation the ranks and files crossed like the poles.

"The ancient order of reducing archers into forme by our most skilfull and warlike ancestours, was into hearses, that is, broad in frunt, and narrow in flank, as for example, if there were fue and twenty, thirtie, fue and thirty, or more or fewer Archers in frunt, the flankes did consist of but seuen or eight rancks at the most."—*Certen Discourses. Smythe. 1590.*

"they placed their hearses of Archers either before the frunt of their armed footmen, or ells in wings vpō the corners of their batailles."—*Ibid.*

"The archers stode in maner of a herse."—*Lord Berners' Froissart.*

high bearded. Said of an arrowhead with high barbs.

high braced. = *high strung.*

high feathered. Having long, deep feathers.

high mark. See *roving mark.*

high rigged. = *silver spoon head.* Equivalent to and sometimes spelled high ridged.

high strung. Said of a bow with a deep bend.

hinge bow. A folding bow of separate limbs joined by a hinge on the back.

hit, *n.* The striking of an arrow in its mark.

hit, *v. i.* To strike the mark.

hobble, *v. i.* To wobble in its flight;—said of an arrow.

"If the shaft be heavye, it will hoble."—*Ascham.*

hold, *v. i.* To pause at full draw before loosing.

hollow, *adj.*

1. The ordinary sense, as in metal arrows or some fancy wooden arrows.

2. Lacking in spine;—of an arrow.

"weake archers usinge small and holowe shaftes."—*Ascham.*

"Aspe and Salowe, eyther for theyr weakness or lightnesse, make holow, starting, scuddinge, gaddinge shaftes."—*Ibid.*



home, *adv.* An arrow is *home*, or *at home*, or *drawn home*, when it is fully and properly drawn to the correct position for shooting.

horn, *n.*

1. A bow tip. The extreme end of a bow in which the nock is cut. (*Duff.*)
2. A piece of carved horn, containing a nock, set on the end of a bow. Other materials, as metal, fibre, etc., are often substituted for animal horn.

"Place the bottom horn against the hollow of the left foot."—*Hansard*, 73.

horn spoon.

1. A hit in the petticoat. This is the usual sense.
2. Anciently, the worst shot within the inches.
3. The archer who is awarded a horn spoon.
4. The worst hit in the white.
5. A spoon made of horn awarded as above.

"The smallest possible honour arises from hitting the corners without the circles, and the person who does this is presented, by very ancient custom, with a horn spoon."—*Hansard*, 115.

"The Horn Spoon to Mr. Hubback, Thirsk Bowman, for the last worst white."—*Scorton Arrow Records for 1846*.

horse archer. A mounted archer.

"Sir John Smith draws a comparison between the effects of horse-musketeers and horse-archers."—*Roberts*, 52.

horse bow. A bow designed for use on horseback, usually short.

"A horse bow was so called because it was used for shooting on horseback."—*Catalog of Field Museum*.

hoyle, *n.*

1. A small natural eminence, such as a mole-hill, thistle, etc.
2. Such an object used as a mark at short range. See *hoyle shooting*.

"At long butts, short and hoyles, each one could cleave the pin."—*Polyalbion*, Song 26. *Drayton*.

"Hoyle is an old north country word, signifying small eminences, as mole-hills, or thistles, docks and other prominent marks."—*Roberts*, 236.

hoyle shooting. An archery pastime like roving except that the marks, or hoyles, are always at short range.

"Hoyle shooting is a game mentioned by Drayton."—*Roberts, 236.*

hoyle shot. A short shot at a random object.

hunting arrow. An arrow for killing game; light and blunt headed for small birds and animals, heavy and broad-headed for large game.

hunting bow. A short, strong bow for hunting.

increase the mark. To require stronger than normal shooting because of wind or other resistance.

"Both the dryvinge of the wether and the thickinge of the ayre increaseth the marke."—*Ascham.*

inches, *n.* See *the inches.*

in game. Done shooting. That is: game in, or finished. Roberts made the mistake of interpreting this expression as: "In good shooting," and the error has been copied into numerous books, including the first edition of this one. Its only occurrence that I know of is in the following passage:

"to which came many principal Archers, who being in Game and the upshoot given."—*Bowman's Glory. A. D. 1682. William Wood.*

inner white. Formerly the third target ring, now blue; hence, a hit in it counting five.

interrupted draw. Drawing to less than the length of the arrow, pausing for aim and completing the draw for loosing. See *continuous draw.*

Jersey round. See *round.*

jointed bow. A bow of separable limbs united by a socket.

junior American round. See *round.*

keep compass. To observe due elevation.

"houldinge your hande ever of one height to kepe true compasse."—*Ascham.*

keep a length. To shoot a desired distance; especially, several arrows the same.

"He that can shoote fayre, lacketh nothing but shooting streight and keeping of a length, whereof commeth hittinge of the marke."—*Ascham.*

kick, *n.* A jar to the bow hand by a released bow.

"Archers hate to use this bow because of the disagreeable kick."—*Duff*, 9.

kick, *v. i.* To jar in the hand when loosed; said of a bow.

knot gall. In wood, proliferation and irregularity of substance about a knot.

"a bowe . . . not marred with knotte gaule, winde shake, wem, fret or pinch."—*Ascham*.

knuckle tip. = *finger tip*. For citation, see *finger tip*.

lady paramount. In England, she who is appointed or elected to be supreme patroness of an archery meeting, club or society. In America, she who is captain of women archers.

"Star of the Archers, fairest Clorinda, and queen, not of shepherds only, but lady paramount over all the blithe foresters of merry England to boot!"—*Hansard*, 126.

American sense: "Miss Pierce, Lady Paramount of the Bryn Mawr College Archers, has accepted a position as professional teacher."—*Archery News*, July, 1925.

English sense: "Mrs. Forbes, Lady Paramount, kindly provided tea and also gave away the prizes."—*Archery News*, Sept., 1927.

laminated. Composed of three or more layers;—usually of bows, occasionally of arrows.

lap, *v. t.* = *whip*, *v. t.*

lapping, *n.* = *whipping*.

lay a bow straight. To straighten a bow by heat and force.

lay the body in the bow. An old English expression which suggests that drawing should be done with the shoulders as well as with the arms. It occurs in the following passage:

"(my poore father) taught me how to draw, how to lay my body in my bowe, and not to draw with strength of armes as other nations doe, but with strength of the body."—*6th Sermon before Edward VI.* 1549. *Hugh Latimer, Bishop of Worcester*.

length, *n.* The distance to a point so far beyond the mark as will bring the mark into the line of the arrow's flight. Thus, for a mark 4 feet high at 60 yards, the length might be 75 yards. See *keep a length*.

lieutenant of numbers. The contestant making the second best score.

lift, *v. t.* To lift a pin or other weak spot, more wood is left around it in the making. = *raise* and *secure*.

limb, *n.* Either part of a bow from the handle to the tip, distinguished as upper and lower.

line of aim. Any line in the vertical plane between the archer and his mark. = *direction*.

lip, *v. t.* To set a piece of wood in a bow where a flaw has been cut out.

lipping, *n.* A piece of wood set in a bow where a flaw has been cut out.

livery arrow or shaft. The *standard* or *sheaf* arrow formerly issued to English military archers. See *bearing arrow*.

livery bow. The bow formerly issued to English military archers.  
 "in times past there was special care had, that all Liury, or warre Bowes being of the wood of Yewgh, were longer than they now use them."—*Smythe*, 19 1/2.

longbow, *n.*

1. A wooden bow drawn by hand, usually 5½ to 6 feet long.
2. Specifically: The great bow which saw its highest development in mediæval England, sometimes reaching a length of 6 feet 7 inches, weighing 100 pounds and shooting a clothyard shaft of 37 inches.

long out. A distant mark in roving.

loose, *n.*

1. The act of letting go the drawn bowstring.
2. The arrangement of the drawing hand and fingers. This and the equivalent *release* are unfortunate misapplications introduced by Morse of Salem and widely copied. *Draw* is the right word.

loose, *v. t., v. i.* To let go the drawn bowstring.

loose wood. Soft wood.

"Some men shoote so weake that the louse woodes be lykewyse for them bigge enoughe."—*Ascham*.

loosing fingers and hand. = *drawing fingers* and *hand*.

Lord Baltimore round. See *round*.

low braced or strung. Braced less than a fistmele.

low feathered. Having short, shallow feathers.

lug, *n.*

1. A big, clumsy bow.

"The other is a lugge slowe of caste, followinge the stringe."—*Ascham*.

2. A dialectic word for *bow*, as there was a "Lug and Arrow Society," in 1877. (*Scorton Arrow Records*.)

lumpish, *adj.* Unduly bulky, sluggish, and awkward in action.

"It is better to have a shaft somewhat to light, than over lumpishe."—*Ascham*.

"such like woods make dead, heavye, lumpishe, hobbling shaftes."—*Ibid*.

lurch, *n.* See *no lurch*.

make, *v. t.* To make a gold or ring is to hit it.

mark, *n.*

1. Anything at which an arrow is shot.

2. A *butt mark*.

3. The crest of an arrow. Not good usage.

4. An archer's individual sign to indicate any article that is his.

"with the marks of the several archers in the line at the left."—*The Archer's Manual*, 56. *The United Bowmen of Phila.* 1830.

mark, *v. t.* To signal results at clout shooting.

mark shot.

1. The distance from an archer to his mark.

2. A shot at a mark.

marker, *n.*

1. One near a clout who signals results.

"The diminutive size of the clout renders a marker necessary."—*Hansard*, III.

2. His flag or the like. See *wide arrow* for citation.

marking, *n.* A space around a butt-mark in which the arrows count. *The inches*.

Master of the Green. I introduced this word in 1914 when I was president of the N. A. A. and responsible for the tournament. It originally meant the man who arranged and cared for the field, but later it was confused with Field Captain.

measure golds. To measure the relative distances of golds from the centre.

Mediterranean loose. The draw and loose by the first three fingers. It is a word coined by Morse of Salem on a theory long exploded. See *English loose*, *finger draw*.

meeting, *n.* A large and formal archery contest.

metropolitan round. See *round*.

Mongolian loose. The draw and loose by the thumb only, usually with the tip tucked under the forefinger. It is another of Morse's terms.

musket arrow. A feathered wooden arrow of the 16th century to be fired from a musket.

"A Complete List of the Royal Navy of England, in the year 1599.—At the Tower of London.

Livery arrowes, 14,125 shafts.

Crosbowe arrowes, decaied, 500.

Muskett arrowes, with 56 to be new feathered, 892.

Longbowe arrowes with firewoorkes, 98 shefe decaied."—*Hansard*, 371.

national round. See *round*.

nock, *n.*

1. Either of two tips of horn fastened on the ends of a bow and having notches for holding the string. See *horn* and *bow horn*.
2. The notches cut in the above or in the bow itself.
3. The slot in the end of an arrow, for the string.
4. A *nock piece*.
5. The butt end of any arrow.  
"He took his arrow by the nock."—*Chapman*.
6. In ancient English and most Oriental arrows, a thick bulbous end of the arrow stele containing a notch for the string.
7. The notch in a crossbow for holding the string when the bow is bent.

nock, *v. t.*

1. Of a bowstring; in bracing a bow to slip the eye into a bow nock.
2. Of an arrow; to fit it on the string.
3. To furnish a bow or an arrow with a nock or nocks.

nock piece. A wedge of horn or other hard material, containing a nock, to be inserted into the butt of a stele. See *double nock*.



nocking, *n.* The place on the finger or finger tip where the string touches.

"Have a goose quyll spletted and sewed against the nockynge, betwixt the lining and the leather."—*Ascham*.

nocking point. The, usually marked, place on a string where an arrow should be nocked.

"The nocking point must be of just such thickness as will fill the nock."—*Ford*, 40.

No lurch! A command indicating no stop (lurk, lurch) until a specified score is made.

"Seven the game. No lurch!"—*Hansard*, III.

noose, *n.* The thick, rope-like, free end of a bowstring, to be fastened to the nock by a timber hitch. See *eye*.

nut, *n.* A pivoted piece, as of bone or steel, on the stock of a crossbow, with a notch to hold the string when the bow is bent.

Ohio round. See *round*.

Oriental loose. = *thumb loose*, *Mongolian loose*, *Asiatic loose*.

Oriole round. See *round*.

outer white.

1. A former name of the outermost target ring when the present blue was the inner white.

2. A hit in it, counting 1.

over arrow or shot. An arrow, or shot, above the mark. A *gone* arrow.

overbowed. Provided with a bow too strong for the archer.

overhand, *adj.* With the mark seen above the bow hand. See *forehand* and *underhand*.

overhand arrow or shaft. = *forehand shaft*.

overshoot, *v. t. and i.*

1. To shoot too high.

2. To shoot better than one's adversary.

overshot, *p. p.* Defeated.

overstring, *v. t.* To string a bow with too short a cord.

overstrung, *p. p.* Having too short and hence too high a string; said of a bow.

"Nor can a bow, overstrung, send an arrow so far as one understrung."—*Waring*, 38.

pair, *n.*

1. Two arrows. This is the sane, ancient and ordinary sense.
2. Two arrows with a spare one. The practice of using three arrows instead of two at an end was originated by George IV, when Prince, but they are not called a pair. Probably this use of the word *pair* was a localism of the Royal Toxophilites.

"On which account, in archery, three arrows are called a pair; that, if one is broke, lost, or injured, the archer may have two (the number used at a time) left of equal weight."—*Roberts, 154.*

The above quotation, and copies of it, afford the only instance I have found of the use of three arrows for a pair.

pair, *v. t.* To balance arrows against each other to match them for weight.

paper game. A form of butt-shooting where the inches are covered by a paper square or circle of proper size.

"The Cheshire and Lancashire mode of shooting the paper-game at butts is this:"—*Hansard, III.*

papingoe, *n.* Scotch variant of *popinjay*. Also spelled *papingo*.

papingoe shooting. *Scotch.* = *popinjay shooting*.

parabolic feather. Literally, a vane of parabolic outline, but, in practice, the same as a *swine-backed* or *balloon* feather.

parallel arrow. One with the same diameter from the feathers to the point. Sometimes the shaftment may taper to the nock.

party, *n.* Five ends of two arrows in Scottish clout-shooting at the rings.

"Five ends constitutes a 'party' and there were three 'parties' shot."—*Archery News, August, 1924.*

pellet bow. = *stone bow 1.*

"The pellet bow is peculiar to the Gran Chaco."—*Catalog of Field Museum.*

pennate shaft. An arrow. *Poetic.*

penny, *n.* A measure of weight for arrows. One-twelfth of a shilling, or about  $7\frac{1}{4}$  grains.

peep sight. A perforated sight affixed to either bow or string. Many solid sights are wrongly called peep-sights.

petticoat, *n.* The edge of a target beyond the rings.

"dark green distinguishes its exterior edge, or petticoat."—*Hansard*, 114.

"All beyond the outer white is now termed the petticoat."—*Roberts*.

piece, *n.*

1. = *foot*, *n.*

2. An insertion or addition of new wood to a bow or an arrow.

piece, *v. t.*

1. To foot an arrow.

"Peecinge of a shaft with Brazell and Hollie, or other heavy woods, is to make the ende compasse heavye with the feathers in flyinge."—*Ascham*.

See, also, citation under *roving arrow*.

2. To splice a stele with other wood anywhere for any purpose, as for repair, balance, beauty or increased length.

"Some use to peece theyr shaftes in the nocke, . . . when a good archer hath broken a good shaft in the feathers he is loth to leese it and therefore doth he peece it."—*Ibid*.

3. To splice new wood in a bow where a fault has been cut out.

"As for cuttinge out of freates, with all maner of peecinge of bowes, . . . for peece bowes be much like old housen."—*Ibid*.

piecing, *n.* An arrow footing or any piece of wood set in an arrow or bow.

pike, *v. t.* In bow making, to remove wood locally.

"Freates be first little pinches, the which when you perceave, pike the places about the pinches, to make them somewhat weaker."—*Ascham*.

pile, *n.* An arrowhead without cutting edges, usually cylindrical or conoidal and either pointed or blunt.

pin, *n.*

1. A tiny knot in yew, appearing on the surface as a dark spot.

"an indifferent piece of yew, full of pins, or places where lateral twigs had to be trimmed off."—*Badminton*, 16.

2. The wooden peg by which a prick is stuck to a butt.

"the very pin of his heart cleft with the blind bow-boy's butt-shaft."—*Romeo and Juliet*. *Shakespeare*.

pin centre. = *pinhole*.

pinch, *n.* A faint, superficial line of crushed fibres running transversely across the belly of a bow, or, less commonly, across part of an arrow. See *chrysal* and *fret*. For citation, see *fret*.

pinch draw. A draw by pinching the arrow nock between the thumb and forefinger.

pinch, *v. i.* To develop a pinch.

pinhole, *n.* The centre of the gold, where the compass leg stood in marking the rings.

pitch pocket. A small lacuna of dried sap, or pitch, occurring in yew wood and causing a separation of the fibres.

play in the hand. To bend at the grip;—said of a bow.

pluck down a side.

1. To loose pluckingly, or with a jerk away from the face, thus throwing the arrow to the side of the target.
2. Owing to the obscurity of the subjoined passage in *Toxophilus*, which is the only place I know of in which the phrase occurs, it might mean:—To reduce the total score of one's team.

“Other that never learned to shoote, nor yet knoweth good shaft nor bow, wil be as busy as the best, but suche one commonlye plucketh down a side, and crafty archers which be against him, will be both glad of him, and also ever redye to lay and bet with him: It were better for such one to sit down than shote.”—*Ascham*.

point, *n.*

1. = *arrowhead*.

2. = *wing*, *n. 2.*

“Two points in peeing be enough, least the moystnesse of the earth louse the glue.”—*Ascham*.

In some commentaries on *Ascham* this word has been incorrectly defined as “a measure in piecing arrows,” the writers not grasping the fact that to *Ascham* *piecing* meant *footing*.

3. Any unit of scoring.
4. In the modern English system, a unit given for the greatest score or most hits at a given distance.

point blank.

1. Aim taken at a distance so short that the arrow flies in a trajectory that is practically flat.

2. Aim taken at a distance where the point of aim and the mark coincide.

point of aim. The point at which one would aim to hit a target, being higher or lower according to the distance.

popinjay, *n.* A target in the form of a parrot on a pole.

popinjay shooting or game. Shooting at a popinjay.

popymaye, *n.* An ancient spelling or form of popinjay.

"shotyng yn their Long-bowes, Cros-bowes and Hand-gonnes, at Almaner, Markys and Buttys, and at the Game of the Popymaye, and other Game or Games."

—*Patent of Gylde of St. George.* 25 August. 29 Henry VIII.

Potomac round. See *round*.

pouch of arrows. Three arrows; so called by the United Bowmen of Philadelphia.

preference, *n.* One bow limb has the preference of the other if it bend more.

prick, *n.*

1. Originally, a sharp stick, as in other uses of the word, stuck in the ground as a mark, at any distance.

"They cutt them downe two summer shroggs,

That grew both under a breere,

And sett them threescore rood in twaine

To shoot the prickes y-fere (together).

The first time Robin shot at the pricke,

He mist but an inch it froe:"

—*Robin Hood and Guy of Gisborne.*

2. Anything set as a mark to be shot at repeatedly under similar conditions.

"No man under the age of twenty-four years shall shoot at any standing prick, except it be at a rover."—

*Act of 33 Henry VIII.*

3. A small piece of paper, or the like, pinned to a butt as a mark.

"In roving you may use either the butte, or the pricke, by the way, for your marke, as your pleasure shall be."—*Dr. Mulcaster.*

prick, *v. i.* To shoot at a prick. Usually synonymous with *butt shooting*.

"The great string is surer for the bowe, more stable to pricke withall, but slower for the cast."—*Ascham.*

prick height.

1.  $4\frac{1}{2}$  feet, or breast high, the height of a prick (3) from the ground.

2. The high position of the shaft hand in near or prick shooting, formerly level with the ear.

"Another draweth his shaft lowe at the breast, as though he would shoote at a roving marke, and, by and by, he lifteth his arm up pricke heyght."—*Ascham*.

prick length. A short range of prick shooting, as 30 yards or more.

prick shaft or arrow. = *butt shaft*.

"with any prick shaft or flight arrow."—*Moseley*, 239.

prick shooting. Shooting at a prick. Same as *butt shooting*.

prick shot.

1. A shot at a prick.

2. The short distance of prick shooting; a *prick length*.

prick wand. A wand used as a mark. = *wand*, 1.

"But Robin he shott far better than hee,  
For he clave the good pricke wande."

—*Robin Hood and Guy of Gisborne*.

pricks, *n*.

1. = *prick shooting*.

"but at Pricks you are permitted to stand two bows before your mark."—*Roberts*, 234.

2. With *the*, a place for prick shooting, as *the pricks*. = *the butts*.

primary release or loose. A draw and loose by pinching the arrow nock between the thumb and forefinger with no help from the other fingers. It is the best of Morse's terms for the classification of looses. = *pinch draw*.

Prince's lengths. The three ranges of the York round.

Prince's reckoning. Counting hits on the standard target as: gold-9, red-7, blue-5, black-3, white-1; prescribed in 1792 by the Prince of Wales and adopted as standard in 1844 at the Grand National Meeting at York.

purse, *n*. = *cradle*.

quartering wind. See *wind*, *n*.

quiver, *n*.

1. A case or sheath for carrying arrows, usually, but not necessarily, attached to the archer.

2. The arrows in a quiver, collectively.



quiver, *v. i.* To sink into a mark as into a quiver; said of an arrow.

"No sooner does the shaft quiver within its destined mark, than . . ."—*Hansard*, 131. Note: The mark of this passage was a box of sand, in which the arrow would bury itself but would not possibly stick and shiver, or quiver in the sense of shake. Strange to say, this is the first time that the verb *to quiver* has been recognized by any dictionary as used in all tenses. Webster comes the nearest to it by giving the past participle as an adjective.

raise, *v. t.* = *lift* and *secure*.

range, *n.*

1. The distance to which an arrow may be shot. = *cast*, *n. i.*
2. The distance of the mark from the archer.
3. A place for shooting.
4. One of the distances of a round; as the 60 yard range.

range finder. Any device for determining the point of aim. Usually a card or stick held at arm's length and marked with the distances above or below the mark.

range peg. A peg at each distance to mark the position of the archer or target.

red, *n.*

1. The second innermost circle of a standard target.
2. A hit in it, counting 7.

reed, *n.* In cut wood, the surface parallel to the rays, or radius of the log. When distinct annual rings are present it is the surface at right angles to the lamellæ-like edges of the annual rings in longitudinal-radial section. *Definition supplied by U. S. Dept. of Agriculture.*

reflex, *v. t.* To give a bow a permanent set away from the string when unbraced.

reflexed bow. A bow which when unstrung curves opposite to its curvature when strung.

release, *n.* = *arrow release* and *loose*, *n.*

release, *v. t.* and *i.* = *loose*, *v.*

rift, *n.* In cut wood, the surface at right angles to the rays, or radius of the log. When distinct annual rings are present this is the surface parallel or tangential to the rings,

commonly known by lumbermen as plain-sawed or flat-grain surface. *Definition supplied by U. S. Dept. of Agriculture.*

- rodd, *n.* A crossbow for shooting stones. See *stone bow*.  
 "It remains briefly to describe that called in French, *arc a gallet*; or, in England, the rodd, or stone-bow."—*Hansard*, 236.  
 "The rodd is still commonly seen in the shops of the gunmakers, both in London and the north of England."—*Ibid.*, 238.
- rood, *n.* A measure of  $7\frac{1}{2}$  yards.  
 "in archery, distance is measured by yards or (as seems to have been the most ancient practice) by roods, the rood consisting of seven yards and a half, north country measure."—*Roberts*, 153.
- round, *n.* A certain number of shots at given distances, recognized and named by rule or custom.

In England the chief rounds are:

	<i>arrows yards</i>	
York. Adopted in 1844 at York by the Grand	72	100
National Archery Meeting	48	80
	24	60
National. Adopted in 1849 at Derby by the Grand	48	60
National Archery Meeting	24	50
Hereford. Adopted in 1894 by the Hereford	72	80
Round Meeting	48	60
	24	50
St. George's. Adopted by the Fraternity of St.	36	100
George, a London club dating from 1835	36	80
	36	60
St. Leonard's. Modern Style. Adopted by the	36	60
Queen's Royal St. Leonard's Archers	36	50

In America the rounds given above and also:

American. Adopted in 1879 by the National	30	60
Archery Association, at first as a team round	30	50
	30	40
Junior American. Adopted for boys in 1926 by	30	50
the National Archery Association	30	40
	30	30
Columbia. Adopted in 1879 by the National	24	50
Archery Association	24	40
	24	30

		arrows	yards
Jersey. (Men) Adopted in 1930 by the New Jersey State Archery Association	36		80
	36		60
	36		50
	36		40
Jersey. (Women) Adopted in 1930 by the New Jersey State Archery Association	36		60
	36		50
	36		40
	36		30
Lord Baltimore. Adopted in 1932 by the Oriole Archers of Baltimore	36		110
	36		100
	36		90
Metropolitan. (Men) Adopted in 1926 by the Metropolitan Archery Association	30		100
	30		80
	30		60
	30		50
	30		40
Metropolitan. (Women) Adopted in 1926 by the Metropolitan Archery Association	24		60
	24		50
	24		40
	24		30
Oriole. Adopted in 1932 by the Oriole Archers of Baltimore	36		80
	36		60
Potomac. Adopted in the last century by the Potomac Archers of Washington, D. C.	24		80
	24		70
	24		60
Team. (Men) Adopted in 1882 by the National Archery Association. Sometimes called Ohio round.		96	60
Team. (Women) Adopted in 1885 by the National Archery Association		96	50

rove, *v. t.* To shoot an arrow in roving.

"After they had roved three or four idle words to praise a man, straight they marr all at the butts."—1596. *Harington, Apol. Ajax* (1814) 39.

"That no maner persone of this Citie frohensfurth rove, but shote at stondyng prikkes & buttes."—1474. *Coventry Lec. (?) Book*, 389.

1622. *Drayton's Polyalbion*, XXVI, 122. "At Markes full fortie score, they used to Prick and Rove."

"She roved at me with glauncing eye." 1579. *Spencer. Shepherd's Calendar, August* 79.

"At the marke-white of his hart she roved."—*Ibid.*

rover, *n.*

1. A casual mark at an uncertain distance.
2. One of a series of fixed marks at long range.  
"except it be at a rover."—*Act of Parliament*. 33  
*Henry VIII, c. 9.*
3. A strong arrow used in shooting at rovers.
4. An archer shooting at rovers.  
"when shot by a skilful rover."—*Dodds Ballads*, 155.

roving, *pres. p.* The act or practice of one who shoots at rovers.

roving arrow or shaft. A strong arrow for shooting at rovers.  
"Lime, pieced with lance wood, makes a very good  
roving arrow."—*Roberts*, 161.

roving bow. A bow of far cast for shooting at rovers.

roving mark. = *rover*, 2. There are three principal kinds of  
roving marks: 1. Ground marks. 2. High marks. 3.  
Stakes and butts.

"These marks are of three sorts: namely, 1st, Ground  
marks; as land marks, stones, or any other objects that  
are sufficiently distinct, either upon the ground, or not  
more than a foot or two above it. 2d, High marks;  
as trees, tall bushes, &c. 3d, Butts, and prick marks."  
—*Roberts*, 231. See, also, *white*, 2 and *black*, 2.

roving pile. A blunt pile for a roving arrow. It is blunt so that  
it will not stick into a *high mark* and be lost.

run on the bow. Said of shaft feathers that are set in wrong  
relation to the nock and bear unduly on the bow in  
shooting.

"if you do not observe, the other feathers must needs  
runne on the bowe, and so marre your shote."—*Ascham*.

rushgrown arrow. = *bobtail*, which see for citation.

saddle back, *n.* A vane trimmed with sloping ends and a nearly  
level top, suggesting the transverse outline of a saddle.

"the saddle backe is surer for daunger of weather,  
and fitter for smothe flyinge."—*Ascham*.

Saint George's round. See *round*.

Saint Leonard's round. See *round*.

sagittal, *adj.* Of, pertaining to, or resembling an arrow.

sagittary, *adj.* Pertaining to an arrow or archery.

sap wood. Light colored wood next to the bark.

scantling, *n.* The distance from the mark within which a shot is not regarded as a miss. = *garland, marking, the inches.*

"If I may craue your patience till time you see me shoot my bolt, I hope you will not denie, but that as neere the pricke as you are, and as verie an hagler as I am, yet the scantling shall be mine." 1577-87. *Stanyhurst. Descr. Ireland I. 11/2.*

"And then was shooting out of crye,  
And skantling at a handfull nie."

*Yorke, Yorke for my Monie, in Halliws. Yorkshire Anthology, 1851, by W. Elderton, 1584.*

"Not suffering them to eate, til they haue shot neere the marke within a certein scantling."—1591. *G. Fletcher, Russe Commw. XIX. 72b.*

"A poor Blew Cap . . . played so well thereon (a fire-engine) that . . . he could hit within the scantling of a Shilling."—1661. *Fuller. Worthies, II. 191.*

score, *n.*

1. Twenty yards.

"In 1788 the Countess of Aylesford presented a silver arrow to shoot for always at nine score."

2. Twenty paces. In many old writings it is not possible to tell whether *score* referred to paces or yards, but the latter was the standard.

3. The tally.

score, *v. t. and i.* To hit a mark, especially one having a numerical value, as a target ring.

score card. A card ruled conveniently for keeping the detailed scores of various rounds.

scud, *v. i.* To fly too high and off the proper course.

scudding shaft. An arrow that scuds in flight. For citation, see *hollow.*

secondary loose. A primary loose assisted by other fingers on the string. One of Morse's terms.

secure, *v. t.* = *raise* and *lift.*

self, *adj.* Made of only one piece of wood; as, self arrow, self bow.

serve, *v. t.* = *lap* and *whip.*

serving, *n.* = *lapping* and *whipping.*

set, *n.* A permanent bend in a bow or arrow.

"a billet that will take a set from lying on its side."—*Duff, 16.*

set, *v. t.* To straighten wood by heating, correcting the deformity and quickly cooling; said of bows and arrows.

"Ascham alludes to the method used by the Fletchers, of making the wood straight by means of heat, termed by them setting."—*Roberts*, 149.

set the shaft or arrow in the bow. To draw an arrow until its tip catches in the belly of the bow.

"Yet let him take heede of setting his shafte in the bowe."—*Ascham*.

"Men are afraid of the sharp point for settinge it in the bowe."—*Ibid.*

"By the shaft a bow is broken when it is to short and so you set it in your bowe."—*Ibid.*

shaft, *n.*

1. An arrow.

"A shaft hath three principall parts, the stele, the fethers, and the head."—*Ascham*.

2. = *arrowshaft*. A stele.

"before the footing is attached, we test the shaft."—*Duff*, 108.

shaft arm or hand. = *drawing arm or hand*. For citation, see *to the shaft*.

shaft feather. One of the two vanes that lie next the bow. See *cock feather*.

"The great bend hurteth not the shaft feather, as the low bend doth."—*Ascham*. This passage is explained by the fact that in Ascham's time the feathers were so long that they would rub on the bow if it were low strung.

shaft head. = *arrowhead*.

"Necessitye . . . invented a shaft head."—*Ascham*.

shaftment, shaftmond and shaftman. (All are the same word, from Anglo-Saxon *scaft*—a shaft, and *mund*—a hand.)

1. A fistmele. For citation, see *bend*, *n.*

2. The feathered part of an arrow. In mediæval arrows this was about a fistmele, or shaftment, in length.

shake, *n.* A longitudinal crack in wood.

shaky, *adj.* Containing *shakes*.

"shaky, as the woodmen term it, that is, full of cracks."—*Hansard*, 355.



sharp loose. A loose by a quick, rearward movement of the fingers.

"to give his shaft a strong, sharpe, and sodaine loose."  
—*Country Contentments*, 107. (London, 1615.) *Hansard*, 214.

sheaf, *n.* A bundle of twenty-four livery arrows, the quota of an English military archer.

"Old English archers carried into the field a sheaf of twenty-four barbed arrows, buckled within their girdles. A portion of these, about six or eight, were longer, lighter, and winged with narrower feathers than the rest."—*Hansard*, 391.

sheaf arrow. The old English military arrow, of long and heavy stele, full fletching, and narrow head with or without barbs.

"As concerning sheaffe arrowes for war, it were better to make them of good Ashe."—*Ascham*.

"With these flight shafts, they could do execution further than with the remaining heavy sheaf arrows."  
—*Hansard*, 391.

shilling, *n.* A measure of weight for arrows, conventionally 87 grains.

shoot, *n.*

1. A shot.

"If you have any mishap, as in nocking amiss, &c., if you can reach your arrow with your bow, you may shoot again; if it fly further, it is a shoot."—*Aime for Finsbury Archers*. *Roberts*, 234.

2. A prescribed form of archery competition, as *wand shoot*, *clout shoot*.

shoot, *v. t. and i.* To discharge an arrow from a bow.

shoot compass. To shoot with correct elevation.

"To marke his standinge, to shoote compasse, to draw evermore like."—*Ascham*.

shoot down the targets or butts.

1. To begin shooting at the longest range of targets or butts and work down to the shortest; by shooting for a specified time, or by shooting a certain number of arrows, or by shooting until all of the prizes are won.

2. An archery meeting conducted in the above manner. For this meaning the present participle is used.

"Archers present att the Shooting downe of the said targetts."—*Constitution of the Scorton Arrow Society, A. D. 1673.*

shoot in a bow. The correct old English phrase, better than *shoot a bow*. It suggests the archer framed in a drawn bow, tense in the act of shooting.

"Take your bow into the fiede, shoote in him."—*Ascham.*

"Unlawful games kept men from shooting in the long bow."—*Bacon. History of Henry VII. (1641.)*

shooting field or fields. A field, or fields, in old England, near a town, where archers were privileged to shoot at rovers. The most famous were the *Finsbury Fields* of London.

shooting glove.

1. An archer's glove for protection of the drawing fingers.

"A shootinge glove is chieflye to save a mans fingers from hurtinge."—*Ascham.*

2. Finger tips attached by straps or elastic bands to a wrist-band and suggestive of a glove in shape.

"It consists of three fingerstalls of stout leather, sewed to three thongs, which unite at the back of the hand in a strap that extends to the wrist, where it is sewed to another that buttons round the wrist."—*Manual of the United Bowmen of Philadelphia.*

shooting line. The line where the archers stand while shooting at the targets. It should never be called a *firing line*, because a bow is not a fire-arm.

shooting point. A position on the shooting line for each archer, usually marked by a peg.

short, *adv.* Not reaching to the mark; as, the bow casts short.

short arrow. One which has fallen below the mark. See *over* and *wide*.

short out. A near mark in roving.

shot, *adj.* In wood, the changeable, scintillating appearance of a polished surface as in beach or lancewood.

"Guiana lancewood has a distinctive marking which is called shot."—*Duff, 25.*

shot, *n.*

1. A complete act of shooting.
2. The distance an arrow is cast; as, a shot of fifty yards.
3. The result of shooting; as, a shot in the target.

shotten down. Completed or finished; as, the game is shotten down, or, having shotten down the targets.

shoulder, *n.* A projecting ring around a pile.  
 "Sharpe heades at the ende, without any shoulders,  
 . . . no man can pull it certainly as farre at one  
 time as at another because it lacketh shoulderinge."—  
*Ascham.*

shouldered head. = *silver spoon head.*

shower of arrows. = *drift, n. 2*, which see for citation, as well  
 as under *whistling arrow.*

side wind. A wind crossing the line of aim at right angles.

sight, *n.* A mechanical contrivance placed on either the string  
 or bow which enables the archer to aim directly on the  
 gold without recourse to a point of aim. See *peep sight.*

sight, *v. t.* To aim.

silver spoon head. A round arrowhead, originating in the early  
 16th century, which resembled the acorn-like handle ends  
 of some silver spoons of that time, the point protruding  
 from a wider base, or shoulder, which prevented it from  
 piercing a butt too deeply.

"They made a certaine kind of heades, which men call  
 Hie Rigged, Creased, or Shouldered heades, or Silver-  
 spoon heades, for a certain likenesse that such heades  
 have with the knob ende of some silver spones."—  
*Ascham.*

single end. An end at one of two facing targets or butts. See  
*double end.*

single fish. See *fish, n.*

single round. = *round.* It is used only to emphasize a distinc-  
 tion from *double round.*

single targets. Targets at only one end of a range.

sink, *v. t.* To reduce the weight of a new bow by drawing it  
 repeatedly or by shooting in it. See *tiller, v. t.*

"Take your bow into the field, shoote in him, sincke  
 him with deade heavy shafts."—*Ascham.*

slash, *v. i.* To loose in a quick, plucking manner.

slashing loose. A quick, plucking release.

sleeve, *n.* A military formation narrow in rank and deep in file  
 flanking a larger body of troops.

"all the rest (archers) they reduced into sleeues, close by the flanks of their three battailes, of which sleeues some of them were of fve in a rancke, and some three in a rancke; and because they should bee surelie garded with shot, they reduced sleeues, or rather squadrons of Caliuier shot close to the flanckes of the Archers, of which sleeues of Caliuier shot, some were of nine and twentie in a rancke, other of fteene in a rancke, and the smallest sleeues of eleuen in a rancke."—*Certen Discourses. Smythe.*

sluggish loose. = *dead loose.*

snake, *n.* A shot arrow hidden under grass or leaves.

snake, *v. i.* To disappear under grass or leaves;—of a shot arrow.

souce, *n.* An erroneous phonetic spelling of *sous* appearing in the Scorton Arrow records for 1770. It indicates the popular pronunciation at that time.

sounding arrow. A name given to *whistling arrows* in the catalog of the Field Museum of Chicago.

"Blunt sounding arrows were used under the Manchu dynasty."—*Catalog of Field Museum.*

sous, *n.* (The plural of *sou*, which, in England, meant a farthing.)

1. Formerly, the outermost target ring, a hit in which entitled the archer to receive a sou or farthing.

2. The petticoat.

"whoever shot his arrow into the sous or petticoat."—*Roberts.*

spell, *n.* A rising of the ends of the grain, where they may be cut across, in the back of a bow. If the separation be narrow and long it may be called a *splinter*.

"to swadle a bowe much about with bandes, veye seldome doth anye good, excepte it be to keepe down a spell in the backe."—*Ascham.*

spine, *n.* A quality in arrows resulting from firmness combined with springiness.

"The claim that any stiff shaft has a good spine does not hold good, because a good spine really calls for spring."—*Duff, 100.*

spirit, *n.* = *cast, 2.*

splice, *n.* A fish joint in a bow or arrow.

splice, *v. t.* To unite by a splice, as the limbs of a bow or the footing and shaft of an arrow.

spliced bow. A bow made of distinct limbs joined by a splice.

splinter. See *spell*.

spoon, *n.*

1. = *horn spoon*.

2. By very ancient custom, the prizes at target shooting were silver spoons.

sprangle, *v. t.* To traumatically muss or separate the barbs of a vane.

square shorn. = *saddle backed*. For citation, see *swine backed*.

squirt, *v. i.* To shoot inaccurately, see *drib*. The two words occur in the citation under *dribber*. My guess is that the *dribber* aims poorly and the *squirter* shoots as Ascham calls "unhandsomely," probably pushing the bow and jerking the loose.

squirter, *n.* Substantive of the verb *squirt*.

stack, *v. t.* To make the belly of a bow higher than wide.

stagger, *v. i.* = *hobble*.

stake, *n.*

1. A post of wood, sometimes in a stone base, often elaborately ornamented, set up as a rover in an old English shooting field. See *stakemaster*, for citation.

2. A stake sharp at both ends to plant before an archer against cavalry.

stakemaster, *n.* An official of the shooting fields of old England.  
 "Then the odd Devise of Saint Clements Parish, which but ten days before had made the same Show in their own Parish, in setting up the Queens Majesties Stake in Holborn fields, which Stakemaster Knevit, one of the Gentlemen of her Majesties Chamber, gave unto them at his cost and Charges."—*Bowman's Glory*, 48.

stand in the wind. To fly steady and true in a wind.

stand in a bow. To be strong enough to be shot without buckling;—of an arrow.

"The lightest arrows that will stand in the bow are made use of."—*Roberts*, 237.

"stronge enoughe to stande in a bowe, and also light enoughe to fly farre."—*Ascham*.

standard arrow. The old English clothyard shaft of 37 inches as provided for military archers.

"Every Englishman (in Ireland) . . . is commanded to provide himself with an English bow of his own length and one fistmele at least, between the nocks, with twelve shafts of three quarters of the standard."

Note:—As all arrows are at least 27–28 inches long this would indicate that the *standard* was 36–37 inches.

standard target. See *target*, 3.

standard yard. Our ordinary yard of 36 inches.

standing, *n.* The first of Ascham's five points, meaning the correct attitude of an archer while shooting. It is the true old English word and should never be supplanted by the Scottish golfing term *stance*.

standing mark. A mark at which the archer always shoots from the same position.

"These butts were often shot at as roving marks, and not, as we generally shoot at them at this day, as standing marks, without changing the distance at every shot."—*Roberts*, 231.

start, *v. i.* To jump suddenly out of the line of aim when loosed.

starting shaft or arrow. One that jumps from its true course when loosed. For citation, see *hollow*.

stave, *n.*

1. = *arrow stave*.
2. = *bowstave*.

stele, *n.* The body of an arrow.

"A knotty stele may be suffered in a bigge shaft."—*Ascham*.

stone bow.

1. A handbow with a cradle on the string, or often between two strings, for shooting stones. A *pellet bow*.  
 "Then shall the right-aiming thunderbolts go abroad, and from the clouds, as from a well-drawn bow, shall they fly to the mark. And hailstones full of wrath shall be cast as out of a stone-bow."—*Wisdom of Solomon*, V, 21.
2. A crossbow for shooting stones. A *rodd*, which see for citation.



stopping, *n.*

1. The bottom of the socket in an arrowhead.
2. The solid end of a pile; especially, a solid bit of metal to which the socket wall is brazed.

strale, *n.* An obsolete, but formerly common, word for arrow. It has widely distributed congeners in the Teutonic group of languages.

string, *n.* = *bowstring*, *n.*

string, *n.*

1. To fit a bow with a string. The ancient and proper use.
2. To brace a bow.  
"In stringing their Bows; it was usual to hold the Bow in the left hand by the middle, etc."—*Moseley*, III. (Published 1792.)

stringer, *n.* A maker and seller of bowstrings.

"Now what a stringe ought to be made on, I leave that to the judgement of stringers, of whom we must buy them."—*Ascham*.

string hand, *n.* = *drawing hand*.

"Before long he raises blood blisters on the fingers of his string hand."—*Duff*, 151.

sugar-loaf pile. A conoidal pile with rounded end. Its shape suggested the old fashioned sugar-loaf and nearly followed modern stream lines.

"particularly when he uses the sharp or sugar-loaf pile."—*Roberts*, 194.

swallow tail, *n.* = *broadhead*, which see for citation.

sweet, *adj.* Easy to the hand;—of bows which do not kick.

swine backed, *adj.* Trimmed convexly, but higher near the rear, like the outline of a pig's back. See *parabolic* and *balloon*.

"whether somewhat swyne backed (I must use shoot-ers words) or sadle backed, whether rounde or square shorne."—*Ascham*.

tab, *n.* A flat leather piece to protect the three drawing fingers, slotted for the arrow hold.

"It is not easy to hold the arrow on the string, nor is the tab easy to use."—*Badminton*, 326.

tackle, *n.*

1. An arrow. In ancient usage only.
2. The complete equipment of an archer.

The origin of this word offers a curious confusion between Teutonic and Gaelic sources because each had words that probably were not analogous but which sounded alike and had meanings that could be applied to weapons. On the Teutonic side are Middle-Low-German: *takel*=equipment generally, as of a ship or horse; Low-German and Dutch: *takel*=hawser, pulley; Middle Dutch: *takel*, *v. t.* to grasp or seize (as in modern English, *tackle*); Danish: *takke*=a spike; Old French: *taque*=a nail. On the other hand, in Gaelic, is Irish: *taca*, Scotch Gaelic: *tacaid* and Brehon: *tach*, all of which mean a nail or *tack*. Furthermore the Dutch: *tak*=a bough may suggest something like that for a word meaning an arrow, just as a bow, in the old ballads, is "made of trusty tree." I believe that the meaning of *tackle*, and its origin, are confused between an arrow, as a *tack* or sharp pointed implement, and equipment of the man as of a ship or horse. As the second definition is so well known, the following quotations are given to support the first (an arrow).

"Archers are not, perhaps, aware that the Welsh word *tackl* literally means *an arrow*. By extension, it is properly applied to the whole shooting apparatus."—*Hansard*, 360.

"It (a bow) suld hafe bene sone out of pyth to schot ony takil vith."—*Sc. Leg. Saints*. (1375.)

"A sheef of pecok arwes bright and kene,  
Wel koude he dresse his takel yemanly."

—*Chaucer, Prologue*. (1386.)

"Shette att me so wondir smert,  
That thorough myn eye unto myn hert  
The takel smote, and depe it wente."

—*Romance Rose* (about 1400).

"His bow . . . bend hes he.  
Tharin a takyll set of sovyr tre."

—*Douglas, Æneis*. (1513.)

tail, *n.*

1. *wing, n. 2.*

"until lately all arrow makers spoke of the protruding ends of the footing as tails."—*Duff*, 113.

2. The posterior portion of an arrow, the shaftment.

tailor's yard. = *standard yard*.

taper fashion. = *bobtail*, which see for citation.

target, *n.* Originally, this word meant a small shield and so, when it is used to describe a shooting mark it should properly be limited to something movable which resembles a shield. However the meaning is now extended to include all marks.

1. A mark.
2. A circular bass of any size, faced as required by circumstances.
3. A standard target, that is, for England and America, a bass of more than four foot diameter with a four foot face divided into a bull's-eye and four rings, all rings and the radius of the bull's-eye being of the same measure; colored: gold, red, blue, black and white. See *petticoat*.

target arrow or shaft. The light, pile tipped, arrow of modern competitive archery, nearly identical with the ancient *butt shaft*.

target bass or bast. = *bass* and *bast*.

target bow. Any bow suitable for target shooting, usually of lighter weight than the powerful hunting and roving bows.

target day. A day set by a club for formal shooting.

"The Fifth Target Day of the Royal Toxophilite Society."—*Archery News*, October, 1922.

target meeting. = *bow meeting*.

target pegs. Pegs for securing the legs of a target stand.

target stand. A tripod to hang a target on.

tassel, *n.* A pendant of woolen yarn for wiping arrows, hung from the belt.

test bow. In China, a bow for testing the strength of military candidates, a set varying in weight from about 65 to 156 pounds. There is a practically complete set of them in the Field Museum at Chicago.

the inches. In butt shooting, the space around the pin within which arrows must strike; from 4 inches at 30 yards to 16 at 120.

"arrows which do not reckon except when within the inches."—*Hansard*, III.

thumb, *n.* A small measure in butt shooting; the thickness of the first joint of a man's thumb. Practically it is an inch, though the ancient measure of a digit, in various countries, was about  $\frac{3}{4}$  inch.

thumb draw. An Asiatic method of drawing a bowstring with the thumb, usually covering the thumb nail with the forefinger for support. See *Asiatic, Mongolian, Oriental*.

thumb loose. The release of a bowstring drawn with the thumb. See *thumb draw*.

thumb ring. A broad ring to protect the drawing thumb of an Oriental archer; made of bone, jade, ivory and the like.  
 "a ring is used on the thumb, the string being caught by the edge."—*Badminton*, 81.

thumbs, *n.*

1. With the Royal Company of Archers: an arrow between the legs of a clout stand.
2. With the Woodmen of Arden: An arrow within a *thumb* of the clout.

tiller, *n.*

1. A notched stick used to hold a bow drawn, especially in making.
2. The handle of a crossbow.  
 "A few substitute the gun-stock for the ancient tiller."—*Hansard*, 228.
3. A similar shaft fixed on a longbow for use as a crossbow.

tiller, *v. t.* To ascertain the curvature of a bow by the use of a tiller, and to correct irregularities by proper treatment.

"I would desyre all bowyers to season theyr staves well, to work them and synke them well, to geve them heetes conveniente, and tylleringes plentye."—*Ascham*.

tiller bow. A crossbow.

"every One bearing a Tiller-Bow or Cross-Bow."—*Bowman's Glory*, 45.

timber hitch. A temporary noose by which the straight end of a bowstring is fastened to the lower nock.

"the other end is made into a twisted knot or noose termed a timber hitch."—*Roberts*, 126.

tip, *n.*

1. = *finger tip*.
2. = *arrowhead*.
3. = *bow horn*. See *horn*, *n.* 1 and 2.

tip, *v. t.*

1. To sew finger tips or reinforcements to a shooting glove.
2. To put on an arrowhead.
3. To put on a bowhorn.

to the bow.

to the shaft. The meaning is best explained by the citation: "A man is said to shoot, and his arrow is said to fly, to the bow or to the shaft, as his arrow flies to the bow-hand or shaft-hand side of his mark."—*Roberts*.

too much up. Braced too high.

tournament, *n.* In America, a formal archery contest. A *meeting*.

toxophilite, *n.* A lover, student, and practitioner of archery.

toxophilitic, *adj.* Relating to the love, study, and practice of archery.

toxophily, *n.* The love, study, and practice of archery.

trajectory, *n.* The path of a flying arrow.

tread, *v. t.* To brace a bow by pressing the foot against its centre.  
"some bows being so strong as to require the aid of the foot in bending them sufficiently, the operation being termed treading."—*Archibald Duncan in the Weekly Scotsman, Edin., June 14th, 1930.*

triangular feather. A pointed vane with straight, sloping top.  
"to shere a shaft after the tryangle fashion."—*Ascham*.

turtle back shooting. Shooting with nearly vertical trajectory to hit a target laid flat on the ground.  
"Specialties that most interested the spectators were the flight and turtle-back shooting."—*Badminton, 467.*

two piece bow.

1. A jointed bow.
2. A backed bow.

underbowed, *adj.* Using a bow that is too weak for the shooter's strength.

underhand, *adj.* and *adv.* With the mark seen under the bow hand when at full draw. See *underhand shaft* and *shooting, forehand*.

"Loxly puld forth a broad arrow. He shott it underhand."—*Robin Hode and Queen Katherine, XXIX. Percy ms.*

underhand shaft. An arrow shot with the mark seen under the bow hand; hence, a weaker shaft in a weaker bow than *forehand*, *q. v.*

"the underhand must have a small brest to go clene away out of the bow."—*Ascham*.

underhand shooting or shot. Shooting, or a shot, with the mark seen under the bow hand; hence, shooting in a weaker bow than for *forehand shooting*.

"fit for them which shoote under hand because they shoote with a softe louse."—*Ascham*.

understring, *v. t.* To string a bow with too long a cord.

understrung, *adj.* Having too long and hence too low a string; said of a bow.

unfledged, *adj.* Having no vanes.

"shot an unfledged arrow."—*Hansard*, 389.

union bow. A bow formed of more than one piece of wood, either backed or laminated. It is a poor and rare word. I have never heard it spoken.

unstring, *v. t.* To relax a braced bow by disengaging the string from one nock.

upshot, *n.*

1. The final reckoning, or result. This is the usual sense where *shot* equals *scot*, as in *scot free*, and means a reckoning, as can be seen more fully in any good dictionary. It is probably used in this ordinary sense even in the following quotation about archery: (See in *game*.)

"This noble King (Henry VIII) at another time keeping a Princely Court at Windsor, caused sundry Matches to be made concerning shooting in the Long-Bow; and to which came many principal Archers, who being in Game and the upshoot given, as all men thought, there was one Barlo yet remaining to shoot."  
—*Bowman's Glory*, 41.

2. *Hansard*, on page 19, gives the following sentence and note, which, so far as I can find, is not sustained by other evidence in print:

"At the close of the livelong summer's day, I believe no archer ever heard the upshot given without regret; (Footnote to *upshot*) The final target round, which puts an end to the day's sport."

It is pleasing to conjecture that the upshot, or upshoot, might have been the last shoot up to the starting point but I cannot verify it.

up wind. A wind blowing from the mark to the archer.



vane, *n.*

1. An arrow feather.
2. The soft part of a feather as distinguished from the quill.
3. As occurring in *weather vane*, it is probably a different word, a dialectic form of *fane*, which means a banner, flag or weathercock.

wag, *v. i.* = *hobble* and *stagger*.

wagging arrow. = *hobbling* or *staggering* arrow and *fishtail* 1.

wand, *n.*

1. A peeled stick set up as a mark.  
 "Twyse Robyn shot about,  
 And ever he cleved the wande."—*A mery geste of Robyn Hoode*.  
 "There they set up two hasell rodde  
 Twenty score paces betwene.  
 I hold him an archar, said Cloudsle,  
 That yonder wand cleveth in two."—*William of Cloudesley's ballad*.
2. A slat two inches wide and standing six feet above ground, used in the wand-shoots of the National Archery Association.

wand shoot. In America, a round of 36 arrows shot at a wand (see *wand*, 2) at 100 yards for men and 60 yards for women.

wand shooting or shot. Shooting, or a shot, at a wand, either informally or in a wand shoot.

war arrow.

1. = *standard arrow*, *livery arrow*.
2. In general, arrows of any nation which are designed for human slaughter rather than for the chase.
3. An arrow sent by runners among the ancient Scandinavians as an order to report for military service.  
 "He at once took a war-arrow and sent it in four directions, summoning thegn and thrall with full war-dress to come and defend the country."—*Viking Age*, II, 103. *Du Chailly*.

war bow.

1. Any strong bow used in warfare. A *battle bow*, *q. v.*
2. In old England, the great longbow used with a clothyard shaft.  
 Extant specimens are 6 feet 4 inches to 6 feet 7 inches.

ward mote. The annual gathering of the Woodmen of Arden. It has not come down in this connection from ancient times but was adopted for quaintness when the club was formed in 1785.

web, *n.* = *vane*, 2.

weigh, *v. t.*

1. To ascertain the weight of an arrow in terms of grains or shillings.
2. To ascertain the pounds required to draw a bow to the length of its arrow.

weight, *n.*

1. The weight or heaviness of an arrow as expressed in grains, or in shillings and pence at about 87 grains to the shilling and about  $7\frac{1}{4}$  grains to the penny. Some fletchers weigh against the actual English shilling, which is only 80.73 grains.
2. The force in pounds required to draw a bow to the length of its appropriate arrow.

weight in hand. The avoirdupois weight or heaviness of a bow.

well, *n.* A small leathern cup fixed to, or suspended from, the belt, to hold the tips of arrows thrust thereunder. A *bucket*.

wem, *n.* A discolored or diseased spot in wood. The word is often sophistically confused with, or mistaken for, the more common *wen*. For citation, see *knot gall*.

whaleback bow. A bow with almost wedge shaped, though curved, belly.

"Again, we have the whaleback bow, stacked in the belly to nearly the shape of a cone."—*Duff*, 8.

whip, *v. t.* To wrap or overlay a bowstring with thread, ribbon, or ribbon-like material such as quill or parchment, to protect it from abrasion by arrow nock, drawing fingers, or bracer.

"Bow strings are always whipped (that is wrapped) at the nocking point, and a little above and below it."—*Roberts*, 127.

whip-end, *v. t.* To reduce a bow too much near the ends.

whip ended bow. A bow which comes too much near the ends.

whipping, *n.* Protective wrapping of the middle of the bow-string. = *lapping* and *serving*.

whistling arrow. An arrow made to whistle in flight, the large head, of vegetable ivory, wood or iron, being hollowed out and pierced near the front with a few holes.

"There were likewise three Showers of Whistling Arrows."—*Bowman's Glory*, 74.

white, *n.*

1. A white target, without rings.
2. The fifth or outermost circle of a standard target.
3. A hit in the white ring, counting 1.
4. Any light colored mark used as a rover.  
"If you shoot at any loose white, if it be stricken out of sight, it is no mark."—*Roberts*, 233.
5. The mark pinned on a butt. A *prick*.  
"because he shot so near the white at butts."—*Hansard*, 366.

white, *adj.* Unpainted; of arrows and bows.

whizzing arrow. = *whistling arrow*. This word, as well as *sounding arrow*, appear in the catalog of the Field Museum and, to my mind, are merely coined words meant to describe the actual sound of such an arrow in flight.

wide arrow. One which misses the mark laterally. See *short*, *gone*, *over* arrows.

wind, *n.* The wind is *up* when it blows from the mark to the shooter, *down* from the shooter to the mark, *side* when at right angles, and *quartering* when oblique.

windage, *n.*

1. The influence of the wind in deflecting an arrow.
2. The extent of such deflection.

wind shake. Anemosis; a condition in the wood of some trees in which the rings are separated, as some suppose, by the action of high winds upon the trunk.

wing, *n.*

1. A vane.
2. The part of the footing forming a side of the splice; also called *tail* and *point*.
3. The barb of an arrow.

wing, *v. t.* = *fletch*.

"A regular fletcher can wing many arrows in a very short space of time; Mr. Waring being able to finish a dozen a minute."—*Hansard*, 393.

York round. See *round*.

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